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FINAL REPORT

Corrective Measures Study Interim Report - Soil

**GE Aviation
Evendale, OH**

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GE Aviation
Evendale, OH



SCOTT CORMIER, VICE PRESIDENT
O'Brien & Gere Engineers, Inc.

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1. INTRODUCTION

As outlined in the USEPA-approved Corrective Measures Study (CMS) Work Plan (O'Brien & Gere, 2014), this Interim Report summarizes the soil exposure pathway evaluation associated with a future Institutional and Engineering Controls (I&EC) program for the GE Aviation facility (Facility) located in Evendale, Ohio (Figure 1). Although several affected environmental media are addressed in the CMS Work Plan, only the soil exposure pathway is discussed within this Interim Report.

1.1 BACKGROUND

The GE Aviation facility is located on an approximately 400-acre site in southwestern Ohio's Hamilton County, approximately ten miles north of Cincinnati. The Facility is a secure, highly active, long-term manufacturing facility located within the heavily industrialized I-75 corridor between Cincinnati and Evendale, Ohio. The Facility has been used for military and commercial aircraft engine manufacturing since the 1940s. Due to established site security and continued future industrial use, institutional and engineering land use controls are anticipated to be sufficient to control potential exposure to chemical constituents through the soil exposure pathway.

1.1.1 SWMUs/AOCs and Impacted Environmental Media

Based on the USEPA's 1989 Facility-wide Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA), there were 135 solid waste management units (SWMUs) and 20 areas of concern (AOCs) identified at the Facility.

As described in the approved CMS Work Plan, there are approximately 50 SWMUs/AOCs remaining that require further evaluation based on data from the Remedial Facility Investigation (RFI) and other previous investigations. Those remaining SWMUs/AOCs are listed in Table 1 and shown in Figure 1.

Impacted environmental media associated with the remaining SWMUs/AOCs at the Facility include soil, soil vapor, and groundwater. The major groups of chemical constituents associated with these SWMUs/AOCs include volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and metals.

1.2 OBJECTIVES

The objective of this soil exposure pathway interim report (Interim Report) is to identify, based on general conservative assumptions, the areas that potentially require soil risk management at the Facility.

1.2.1 Technical Approach

The technical approach used to meet the objective for this soil exposure pathway Interim Report is as follows:

- Summarize the maximum soil concentrations for specific SWMUs or SWMU areas, including relevant USEPA Regional Screening Levels (RSLs)
- Screen existing soil data against USEPA industrial RSLs¹
- Present a human health conceptual site model (CSM) that identifies the current and future potential receptors and exposure routes (dermal, inhalation, ingestion) for impacted soil media
- Develop preliminary soil cleanup goals using current and reasonably anticipated future land use assumptions, with consideration to grouping of SWMUs/AOCs into certain areas based on geographic

¹ Note that RSLs are a generic screening criterion and that development of site-specific screening criteria may be warranted, either as a follow-up to this evaluation, or at some future time if there is interest in redevelopment and change-of-use of select areas.

location. It is anticipated that these preliminary soil cleanup goals will form the basis for future development of soil corrective measures objectives (CMOs) and, ultimately I&ECs for the Facility.

The results from the soil pathway analysis presented in this Interim Report will be used to develop a practical approach to soil risk management. The CMOs & I&ECs developed during the CMS will be presented in an Institutional and Engineering Control Plan (I&ECP) to be submitted under separate cover. GE is also developing a Facility Soil Management Plan (SMP) to be used at the plant. The SMP will provide more detailed guidelines for soil disturbance and disposal. The SMP will be maintained by the Facility and updated as needed.

2. SOIL EXPOSURE PATHWAY ANALYSIS

This soil pathway evaluation compares Facility data to current USEPA Regional Screening Levels (RSLs), updated most recently in January 2015 (USEPA, 2015). RSLs are derived from risk-based calculations that set concentration limits using carcinogenic or non-carcinogenic toxicity values under site-specific exposure conditions.

2.1 SCREENING ASSESSMENT

2.1.1 General Approach

Given that the Evendale Facility is currently used for industrial purposes and will continue to remain an industrial facility for the foreseeable future, Industrial RSLs for soil are used as the primary screening levels for evaluating soil data. To identify COPCs, maximum concentrations of chemicals in each retained² SWMU/AOC were compared to the Industrial RSLs. Those SWMUs/AOCs are shown on Figure 1.

SWMU 118 (Process Sewer System, shown on Figure 2) was not included in the quantitative screening since worker activities conducted in this SWMU are covered under Facility health and safety procedures and practices to mitigate human exposure to materials within the sewers.

If the maximum detected concentration of a given chemical is less than its respective RSL, it is concluded that exposure to the chemical does not represent an unacceptable risk to human health, and soil remediation based on potential human exposure to this chemical is not warranted. Accordingly, the development of site-specific risk-based soil cleanup levels are not warranted for these chemicals. If the maximum detected concentration of a given chemical is above its respective RSL, the chemical is identified as a chemical of potential concern (COPC) and a numerical risk-based cleanup level will be developed. It should be noted that, for total petroleum hydrocarbons (TPH), six fractions (aliphatics – low, medium, high; aromatics – low, medium, high) were assigned by the USEPA as representative compounds for determination of toxicity values and chemical-specific parameters to calculate RSLs for TPH (USEPA 2009a). Because the relative fractions of aliphatics and aromatics (and the associated number of carbon atoms in each fraction) in RFI soil samples of TPH are not definitively known, the minimum or most conservative RSL for the six representative fractions was used as the RSL (aromatic-low) for preliminary screening of TPH soil concentrations.

2.1.2 Identification of COPCs

Screening tables for each of the Facility SWMUs and AOCs retained from the RFI for additional evaluation are provided in Appendix A. As discussed in Section 2.1.1, the Industrial RSLs are the primary screening values used to evaluate the need to develop preliminary soil cleanup goals. The screening tables provided in Appendix A include risk-based cleanup goals as well as Ohio Voluntary Action Program (VAP) screening levels and BUSTR Action Levels, as well as the Industrial RSLs, to provide additional perspective on the soil quality in each SWMU/AOC. Note that in some cases, some SWMUs/AOCs were grouped based on the close proximity of sample locations in these areas.

Based on the comparisons of detected chemicals to Industrial RSLs for each SWMU/AOC, a total of eight COPCs were identified. These chemicals are comprised of several different chemical classes, including metals (arsenic, cyanide, and nickel), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), VOCs (trichloroethene [TCE]), and TPH.

² The RFI results identified (retained) certain SWMUs/AOCs for further evaluation. Table 1 of the approved CMS Work Plan (O'Brien & Gere, 2014) shows the retained SWMUs/AOCs and the maximum concentrations of chemicals in the retained SWMU/AOC.

Table 1 presents a summary of the chemicals identified as COPCs in each SWMU/AOC group. Figure 3 presents a breakout of SWMUs/AOCs with chemical concentrations above or below Industrial RSLs (or background concentrations, see Section 2.1.3 below). The COPCs identified in each SWMU/AOC are presented in Figure 4.

2.1.3 Background Considerations

Concentrations of metals identified as COPCs (arsenic and nickel) were furthered evaluated with respect to background soil concentrations. A report developed by the Ohio Environmental Protection Agency (Ohio EPA) entitled *Evaluation of Background Metal Soil Concentrations in Hamilton County - Cincinnati Area* (Ohio EPA, 2015) was used as the basis for comparisons of COPC metal concentrations in each applicable SWMU/AOC with local background concentrations. Upper tolerance limits (UTLs) are commonly used to establish a background threshold value, and provide a reasonable upper limit for what is likely to be observed in background. The 95% UTLs established by Ohio EPA for the Cincinnati area are presented below:

Metal	95% UTL Background Concentration (mg/kg)
Arsenic	12.9
Nickel	14.8

Of the 18 SWMUs/AOCs in which arsenic was identified as a COPC in soil samples, arsenic concentrations in 13 SWMUs/AOCs are consistent with or lower than the above-listed local background concentration (Table 1)³. Therefore, arsenic is identified as a COPC in 5 SWMUs at the Facility (SWMUs 16, 17, 18, 27/28, and 124). It should be noted that the Cincinnati area background data set for arsenic is highly variable, with concentrations ranging upwards to 17.5 mg/kg (Ohio EPA, 2015). Therefore, although the 12.9 mg/kg background value is appropriate as a comparative screening tool for identifying COPCs, additional evaluation may suggest that the collective concentrations of arsenic in the SWMUs listed above are consistent with naturally occurring concentrations in the greater Cincinnati area.

Nickel was identified as a COPC in a single SWMU (SWMU 21/22); the maximum nickel concentration is above the reported background concentration as shown on Table 1.

2.2 DEVELOPMENT OF RISK-BASED SOIL CLEANUP GOALS

The development of risk-based cleanup goals for soil incorporates considerations of several factors, including the nature and magnitude of COPCs, current and future land use, exposure pathways and receptors, toxicity information, and target hazard and risk levels. The approach used to develop these site-specific, risk-based soil cleanup goals and the potential receptors to soils via incidental ingestion, dermal contact, and inhalation exposure pathways are described in this section. Risk-based soil cleanup goals were quantified for the chemicals identified as COPCs (see Section 2.1.2), and are provided in Appendix B, Tables B-1 through B-6.

³ Two samples collected in SWMU 8/12 contained concentrations of arsenic above Industrial RSLs and the Cincinnati-area background concentrations; however, these samples were collected from the 16-18 foot bgs interval, beyond the depth at which human exposures can occur via the exposure pathways included in this analysis.

The development of cleanup levels considers the relationships between land use patterns, chemical source areas, and human exposure pathways. A human health conceptual site model (CSM) is typically used to describe the linkages between possible sources of COPCs and potentially exposed human receptors. Specifically, the CSM identifies the potential sources of COPCs, current and future human receptors, and potentially complete exposure pathways. Elements of the CSM are discussed in the following sub-sections, and are used to support the development of risk-based soil cleanup goals. The human health CSM for the Facility is presented in Figure 5.

2.2.1 Current and Reasonably Anticipated Future Land Use

The Facility is located within a heavily industrialized corridor that supports a variety of heavy and general industrial and commercial operations, including chemical manufacturing, commercial product development, trucking, and drum recycling. GE began operating the Facility in 1948 and currently performs aircraft engine testing and manufacturing. Given the operational history and location of the Facility and the ongoing expansion of product operations, the current use of the site as an industrial facility is likely to continue in the foreseeable future.

2.2.2 Current and Future Potential Receptors

Current and reasonably anticipated future potential receptors are identified based on current land use practices and best professional judgment regarding future use. Given the industrialized nature of the Facility, on-site workers are expected to have the highest potential for exposure to Facility-related chemicals in soil. Workers with a potential to incur on-site soil exposure given the site setting and land uses include: 1) general industrial workers who perform the majority of their work activities outdoors, 2) office or general industrial workers whose activities are largely conducted indoors, 3) construction workers that work in excavations and/or are associated with construction of roads, buildings, or other structures associated with facility expansion, and 4) utility workers that perform general servicing, maintenance, or repair of underground utility lines. It is also possible that trespassers may, on occasion, gain illegal access to the facility grounds.

The following potential receptors have been identified:

- Outdoor industrial workers;
- Indoor industrial workers;
- Construction workers;
- Utility workers;
- Adolescent trespassers (12 - <18 years old); and
- Adult trespassers (18+ years old).

2.2.3 Exposure Routes

Relevant soil exposure routes for the identified potential receptors at this Facility include incidental ingestion, dermal contact, inhalation of fugitive (soil) dust emissions, and inhalation of volatile emissions from soil. Based on the results of soil vapor pathway analysis (O'Brien & Gere, 2015) indicating that the soil vapor to onsite commercial/industrial pathway is incomplete, the development of risk-based soil cleanup goals does not consider potential vapor emissions from soil into the indoor spaces of worker-occupied buildings. The vapor pathway is being evaluated separately and is not further discussed in this report.

2.2.4. Risk-Based Cleanup Goal Calculations

In the exposure assessment phase of the baseline human health risk assessment process, reasonable maximum exposure (RME) estimates are developed for both current and reasonably anticipated future land use scenarios. Potential receptors are determined, the magnitude and durations of potential exposures are estimated, and the exposure pathways are identified. The RME estimates are developed by calculating the estimated intake of each COPC using medium-specific analytical data and conservative assumptions regarding potential exposure for each retained exposure pathway. The equations used to develop estimated potential COPC receptor doses (for the

ingestion and dermal contact pathways) and the exposure concentrations (for the inhalation pathway) are well-documented in USEPA risk assessment guidance (USEPA 1989; 2004; 2009b). Once exposure doses/concentrations are calculated, they are then coupled with toxicity values that are protective of human health to derive site-specific numerical estimates of carcinogenic risk and non-carcinogenic hazard.

The equations used to quantify human exposures and risks can be re-arranged to back-calculate soil concentrations that are protective of potential site-specific human receptors (i.e., soil cleanup goals). This concept is the same as that used by the USEPA in its development of RSLs, the technical approach for which is presented in detail in the *RSL User's Guide* (USEPA 2014a). Parameters used in the development of the risk-based cleanup goals for Facility soils can be broken out by receptor-specific parameters, air emission rates, chemical-specific parameters, and target hazard and risk levels. These parameters are summarized below. Additional detail regarding these parameters is provided in Appendix B.

Receptor-Specific Exposure Parameters

Receptor-specific exposure parameters are evaluated based on available information on potential receptor characteristics and behaviors, as well as on best professional judgment. Parameters include soil ingestion rate, exposure frequency, exposure duration, exposure time, skin surface area, soil adherence factor, and body weight. Values applied for the developing risk-based soil cleanup levels at the Facility are derived primarily from USEPA technical risk assessment guidance (USEPA 2002; 2004; 2014b). Exposure parameter values for developing risk-based soil cleanup levels for each potential receptor at the Facility are presented in Appendix B, Tables B-7 through B-12.

Air Emission Rates

A description of the soil particulate and ambient vapor emission rates used to develop risk-based soil cleanup levels is provided in Appendix B.

Chemical-Specific Exposure Parameters

Chemical-specific factors used to develop risk-based soil cleanup levels include dermal absorption factor and gastrointestinal absorption factor. These factors are presented in Appendix B, Tables B-7 through B-12.

Target Hazard and Risk Levels

Valuation of chemical-specific exposure parameters is based largely on available peer-reviewed toxicity data for COPCs. Toxicity values typically employed to calculate non-carcinogenic hazards include reference doses (RfDs) for oral and dermal exposures and reference concentrations (RfCs) for inhalation exposures. Oral cancer slope factors (CSFs) and inhalation unit risks (IURs) are typically used to estimate carcinogenic risks. Target screening levels for potential receptors are based on a human health cumulative excess lifetime carcinogenic risk goal of 1×10^{-5} ; this target risk falls within the acceptable range of cumulative excess lifetime cancer risks of 1×10^{-4} to 1×10^{-6} for site-related exposures, as specified in the National Contingency Plan (NCP). For non-carcinogens, the target cumulative hazard index was set equal to 1. Target risk and hazard levels factors are presented in Appendix B, Tables B-7 through B-12.

Risk-Based Soil Cleanup Goal Equation

Risk-based soil cleanup goals were calculated for the selected potential receptors according to the methodologies described in Section 2.2. Cleanup levels were developed for the individual chemicals identified as COPCs in soil. The total risk-based soil standard (SS_{tot}), which takes into account the potential exposure routes (ingestion, dermal contact, and inhalation), is calculated consistent with the technical approach for RSL development (USEPA, 2014a), as follows:

$$SS_{tot} = \frac{1}{\frac{1}{SS_{ingestion}} + \frac{1}{SS_{dermal}} + \frac{1}{SS_{inhalation}}}$$

where:

SS_{tot} = total risk-based soil standard (potentially applicable exposure routes)

$SS_{ingestion}$ = risk-based soil standard based on ingestion exposure route

SS_{dermal} = risk-based soil standard based on dermal contact exposure route

$SS_{inhalation}$ = risk-based soil standard based on inhalation exposure route

Calculations of preliminary soil cleanup goals for the Facility COPCs in soils are presented in Appendix B, Tables B-1 through B-6 for outdoor industrial workers, indoor industrial workers, construction workers, utility workers, older child trespassers, and adult trespassers, respectively. Note that for each COPC, the lower (more conservative) of the two values for carcinogenic and non-carcinogenic endpoints is selected as the cleanup goal. A summary table of the soil cleanup goals for each potential receptor is presented in Table 2.

3. SUMMARY AND CONCLUSIONS

The following summary highlights the results from the soil pathway analysis at the GE Evendale Facility:

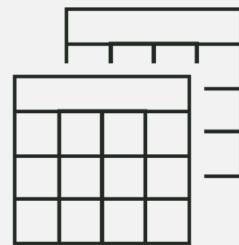
- ***Initial SWMU/AOC Screening*** - Existing soil concentrations from approximately 50 SWMU/AOCs retained for further evaluation during the CMS were reviewed and compared with current USEPA Industrial RSLs and local background soil concentrations of metals, consistent with current and reasonably anticipated future land use at the Facility. Based on this screening of the available data, approximately 20 SWMU/AOCs were eliminated from further evaluation due to soil concentrations below RSLs or background, with a total of approximately 30 SWMUs/AOCs retained for further evaluation.
- ***Identification of COPCs*** - A comparison of SWMU/AOC RFI soil data with USEPA Industrial RSLs and local background soil concentrations of metals for each SWMU/AOC indicated a total of eight COPCs with concentrations above screening levels or background concentrations, including metals/inorganics (arsenic, cyanide, and nickel), PAHs, PCBs, VOCs (TCE), and TPH.
- ***CSM Development*** - A human health conceptual site model (CSM) was developed to identify the relationship between chemical sources and the current and future potential receptors. The CSM was used to assist in identifying complete exposure pathways under current and reasonably anticipated future industrial/commercial land use.
- ***Preliminary Soil Cleanup Goals*** - Potential receptors evaluated to support the development of preliminary soil cleanup goals included indoor/outdoor industrial workers, construction workers, utility workers and adult/adolescent trespassers. Relevant soil exposure routes for these potential receptors include incidental ingestion, dermal contact, and inhalation of soil dust and ambient vapors. Using exposure dose/concentration and toxicity data, risk-based soil cleanup goals were calculated for each COPC for these potential receptors. Values for soil cleanup goals were lowest (most conservative) for the outdoor industrial worker or construction worker given the higher intensity of potential soil exposure by these potential receptors. Calculated soil cleanup goals are shown in Table 3. In addition, cleanup goals exist for the Facility COPCs within the State of Ohio's Voluntary Action and BUSTR programs. These cleanup goals are also shown on Table 3. The CMS will evaluate the preliminary soil cleanup goals to be considered to be applicable for the Facility.

Potential vapor emissions from soil into worker-occupied buildings is not included in the development of soil cleanup goals, based on the results of recent soil vapor pathway analysis presented separately. Vapor pathway evaluation is not within the scope of this report.

- ***Institutional and Engineering Controls*** - The soil pathway exposure analysis will be completed in the CMS and will provide the framework for the development of Facility-wide institutional and engineering controls to support a soil risk management program. Appropriate controls will be more fully developed during the evaluation and selection of corrective action alternatives as part of the CMS.

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Tables

Table 1
Screening Evaluation Summary for SWMUs/AOCs
GE Aviation - Evendale Ohio

SWMU Number	Unit Name	IRP Site No.	RFA	RFI		Recommended Further Action ³
			Evidence of Release	Results Above Industrial RSLs ¹	Retained Metals Above Background ²	
8/12	Temporary Drum Storage Area (Former Bldg. 509) / Drum Crusher Unit		Yes	TCE, benzo[a]pyrene, benzo[b]fluoranthene, TPH, PCBs, As	None	CMS
14	Battery Storage Area		Yes	As	None	--
16	Weigh Station Sump		Yes	TPH, As	As	CMS
17	Reading Road Landfill		Yes	As	As	CMS
18	Sludge Basin Landfill		Yes	TPH, As	As	CMS
19	East Landfarm		No	As	None	--
20	Former North Landfarm		No	Benzo[a]pyrene, benzo[b]fluoranthene, As	None	CMS
21/22	Former 508 Sludge Basin		Yes	TCE, benzo[a]pyrene, benzo[b]fluoranthene, PCBs, TPH, As, CN, Ni	Ni	CMS
27/28	Former Lime Precipitate Basins 1 and 2		Yes	As	As	CMS
29	Lime Precipitate Basin 3		Yes	As	None	--
31	Lime Precipitate Basin 5		Yes	TPH, As	None	CMS
42	Former Chip Loading Area	SS-20	No	--	--	--
61/67	Underground Waste Oil/Fuel Storage Tank 304-7		No	--	--	--
79	Former Bldg. 800 Wastewater Pretreatment System		No	--	--	--
86	Oil/Water Separator 301-2		No	--	--	--
87/88	Oil/Water Separators 303-1 and 303-3		No	PCBs, As	None	CMS
93/94	Oil/Water Separators 500-1E and 500-1W		No	TPH, As	None	CMS
95	Oil/Water Separator 500-2		No	--	--	--
98/99	Oil/Water Separators 703-1E and 703-1W		No	--	--	--
100	Oil/Water Separator 707-1		No	As	None	--
118	Process Sewer System - Sanitary Sewer	SD-23	No	PCBs	--	IRP
122	Stormwater Pumphouse 422		No	As	None	--
123	Stormwater Pumphouse 423		No	As	None	--
124	Stormwater Pumphouse 506		No	As	As	CMS
141	Gravel Media Coalescing Separator	SD-26	No	TPH	--	IRP
142	Bldg. 800 Machine Sump (Added 1/16/91)		No	TPH, As	None	CMS
AOC A	Bldg. P Fuel Spill	SS-27	Yes	--	--	--
AOCs D and I	Bldg. B Fuel Spills No. 1 and 2	SS-28/SS-29	Yes	TPH	--	IRP
AOC L	Bldg. 304 Fuel Spill		Yes	TPH	-	CMS
AOC W2 / SWMUs 62/63	Inactive Underground Product Storage Tanks 417-E M-1; Underground Waste Oil/Fuel Storage Tanks 417-2 and 417-3		Unknown	--	--	--
AOC W3 / SWMUs 64/68	Inactive Underground Product Storage Tanks 515-1 to 27		Unknown	TPH	--	CMS
AOC W4 / SWMU 65	Inactive Underground Product Storage Tanks 507-5,6,13,14		Unknown	TPH	--	CMS
AOC W10 / SWMU 72	Inactive Underground Product Storage Tanks D-1 to 5	ST 15-19	Unknown	TPH	--	IRP
AOC LD	Bldg. 700 South Loading Dock		Yes	TCE	--	CMS
AOC PST	TCF/TCA Product Storage Tanks		Yes	TCE	--	CMS

Notes:

RSL - Regional Screening Level

(1) Analytical results were compared to USEPA Industrial Soil RSLs (January 2015). SWMUs/AOCs shaded in green contain chemicals whose maximum concentrations are below Industrial RSLs or have concentrations that are consistent with background levels.

(2) This column refers to metals with maximum concentrations above Industrial RSLs and soil background concentrations reported for the Cincinnati area (Ohio EPA, 2015).

(3) Under Recommended Further Action:

CMS - Indicates Corrective Measures Study

IRP - Indicates future investigations and/or a Corrective Measures Study

TABLE 2
CALCULATED SOIL CLEANUP GOALS FOR CONSTITUENTS OF POTENTIAL CONCERN
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Constituent of Potential Concern	Receptor						Lowest Soil RG
	Outdoor Industrial Worker	Indoor Industrial Worker	Utility Worker	Construction Worker	Older Child Trespasser	Adult Trespasser	
INORGANICS							
Arsenic	21.50	43.5	188	314	188	62.0	21.5
Cyanide	778	1400	7297	442	1595	2246	442
Nickel	22935	36980	215018	14182	50785	70247	14182
POLYCYCLIC AROMATIC HYDROCARBONS							
Benzo(a)pyrene	3.23	9.0	24.5	50.1	29.5	9.3	3.23
Benzo(b)fluoranthene	32.3	89.6	245	501	295	92.7	32.3
TOTAL PETROLEUM HYDROCARBONS							
Total Petroleum Hydrocarbons	5187	9329	48628	2949	10629	14968	2949
POLYCHLORINATED BIPHENYLS							
PCBs (total)	11.5	32.7	86.4	179	105	32.9	11.5
VOLATILE ORGANIC COMPOUNDS							
Trichloroethene	89.7	86.7	841	35.3	414	455	35.3

Notes:

Units are in mg/kg.

RG - Soil cleanup goal

TABLE 3
SUMMARY OF CLEANUP GOALS, OHIO VAP STANDARDS, AND OHIO BUSTR ACTION LEVELS
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Constituent of Potential Concern (COPC)	Lowest Risk-Based Soil Cleanup Goal	Ohio VAP Generic Standard ¹	BUSTR Action Level ²
INORGANICS			
Arsenic	21.5	77	NA
Cyanide	442	1000000	NA
Nickel	14182	74000	NA
POLYCYCLIC AROMATIC HYDROCARBONS			
Benzo(a)pyrene	3.23	5.8	1.1
Benzo(b)fluoranthene	32.3	58	11
TOTAL PETROLEUM HYDROCARBONS			
TPH	2949	NA	see notes 3 & 4
POLYCHLORINATED BIPHENYLS			
PCBs	11.5	20	NA
VOLATILE ORGANIC COMPOUNDS			
Trichloroethene	35.3	51	NA

Notes:

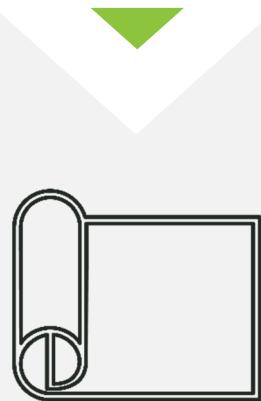
Units are in mg/kg.

1 - BUSTR action level - Class 1 Soil Action Level;

2 - Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

3 - The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH(Aromatic High).

4 - The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).



Figures

FIGURE 1



LEGEND

- SOLID WASTE MANAGEMENT UNIT (SWMU) or AREA OF CONCERN (AOC)
- EXISTING BUILDING
- FORMER BUILDING
- BUILDING ID

**GE AVIATION
EVENDALE, OHIO**

**SWMUs AND AOCs
RECOMMENDED IN THE RFI
FOR FURTHER EVALUATION**



O'BRIEN & GERE

MAY 2015

0 200 400 800 1,200 1,600
Feet

FIGURE 2

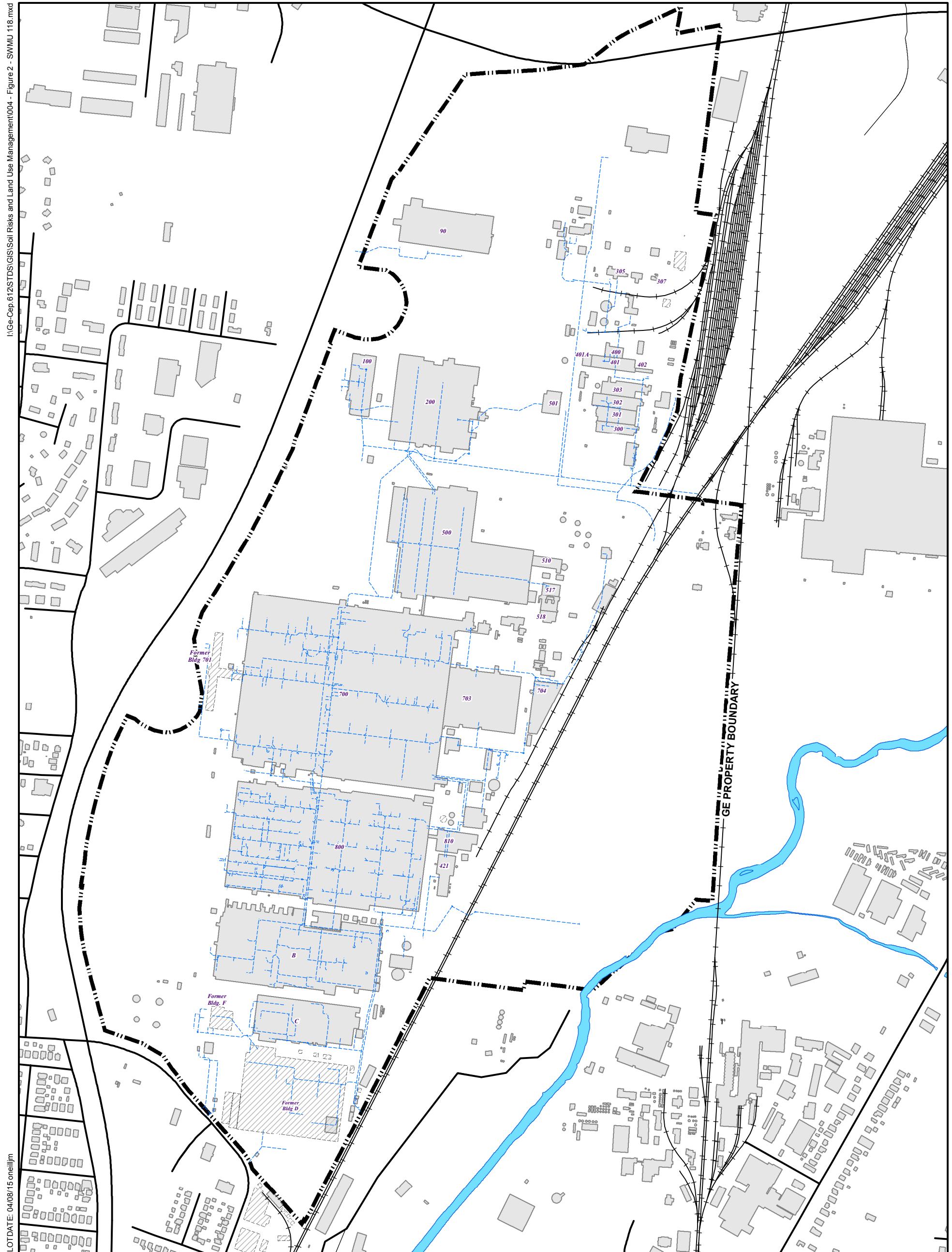


FIGURE 3

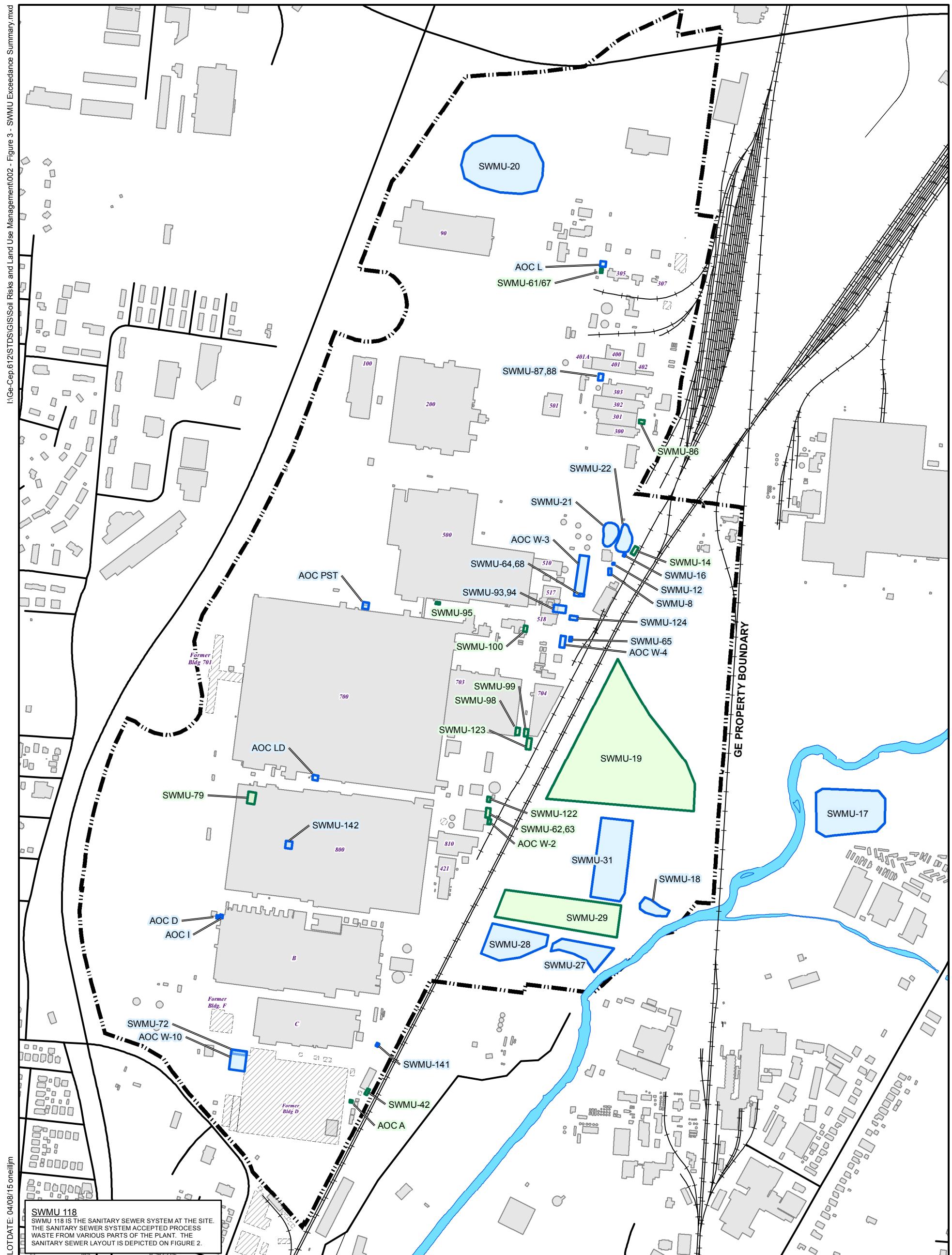
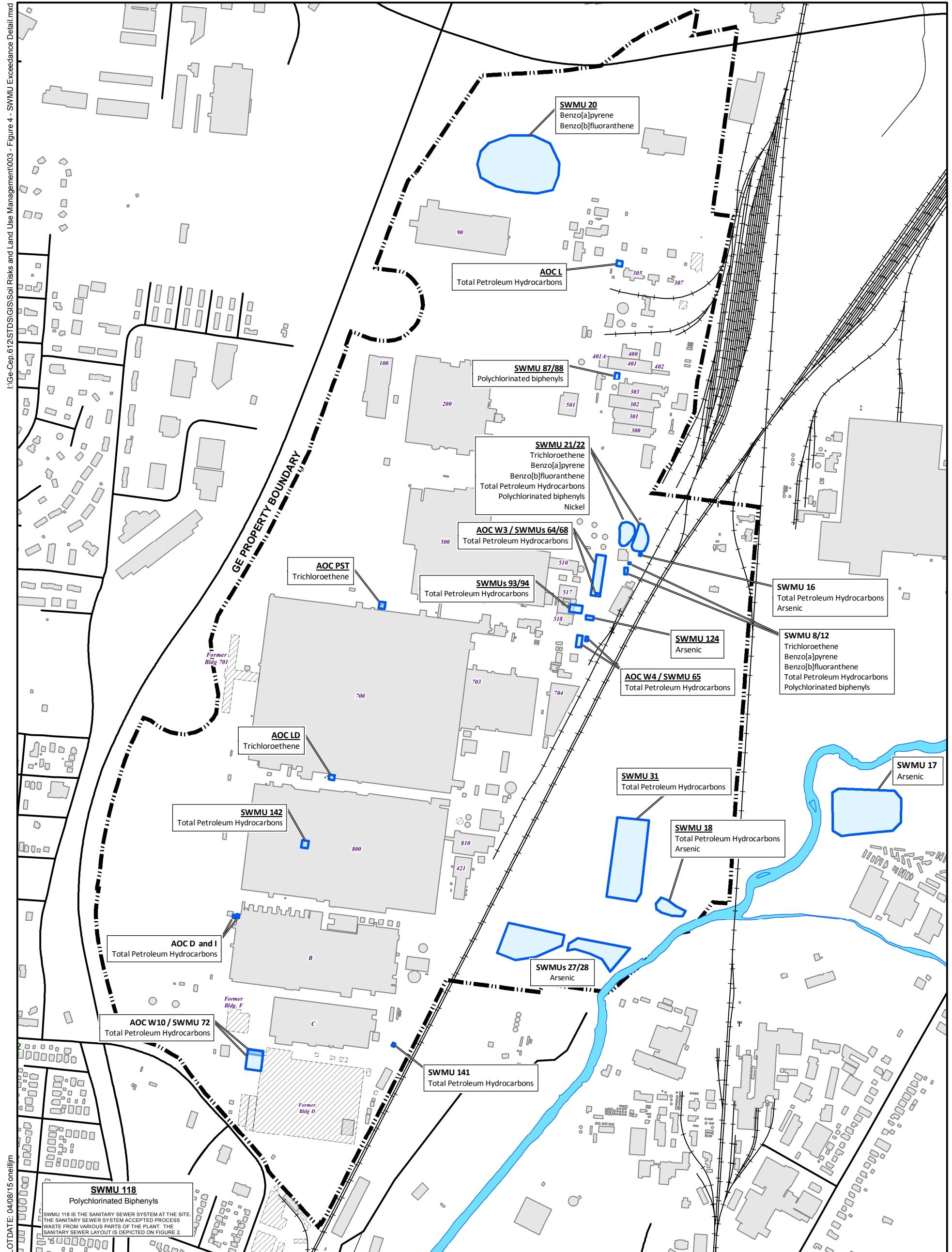


FIGURE 4

**LEGEND**

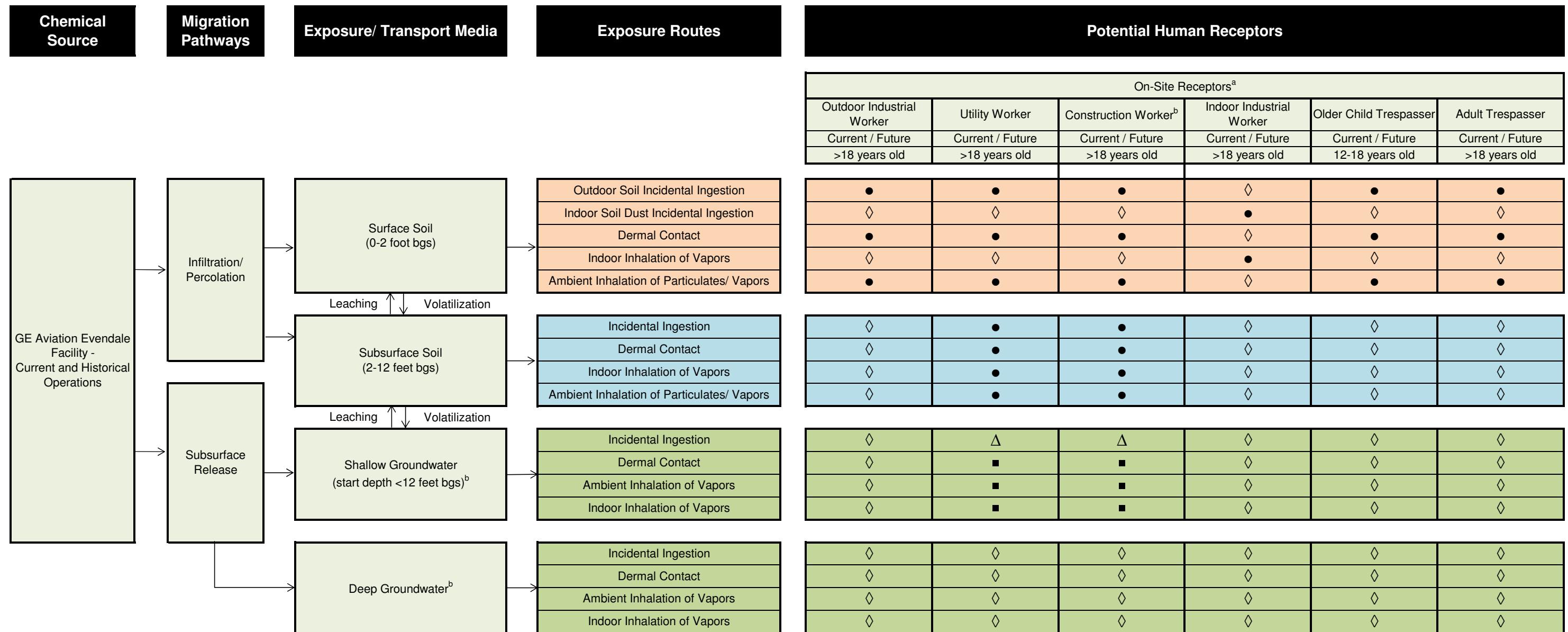
- █ SWMUs AND AOCS WITH ANALYTICAL CONCENTRATIONS ABOVE INDUSTRIAL RSLs OR BACKGROUND METALS
- █ SWMU ID CONSTITUENT
- █ EXISTING BUILDING
- █ FORMER BUILDING
- █ BUILDING ID

**GE AVIATION
EVENDALE, OHIO**

SWMUs AND AOCS

DETAIL OF SOIL ANALYTICAL CONCENTRATIONS ABOVE SCREENING VALUES

Figure 5
Human Health Conceptual Site Model
GE Aviation Evendale Facility
Evendale, Ohio

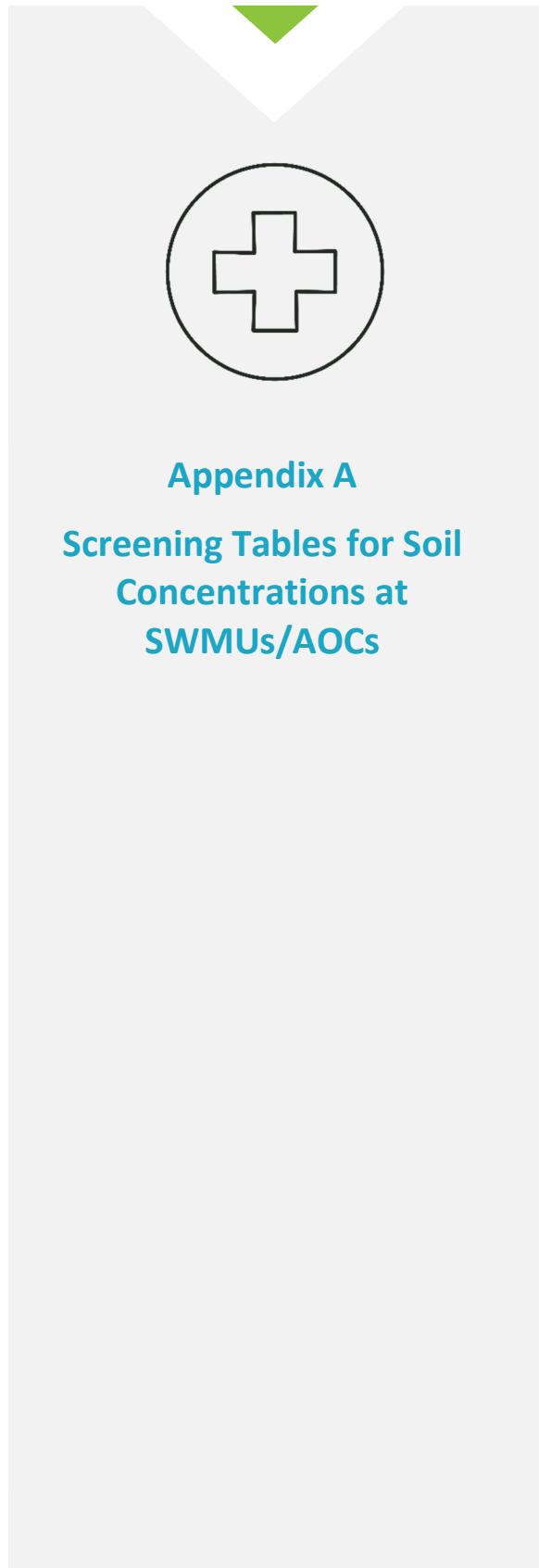


Notes:

- : Potentially complete exposure pathway.
- : Potentially complete exposure pathway to be evaluated in the Corrective Measures Study for groundwater.
- △ : Pathway is considered to represent *de minimis* exposure.
- ◇ : Incomplete exposure pathway.

a: All receptors evaluated under both current and future scenarios.

b: To be evaluated in the Corrective Measures Study for groundwater.



Appendix A

Screening Tables for Soil Concentrations at SWMUs/AOCs

Table A-1
Screening of Detected Chemicals in Soil - SWMUs 8 and 12
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU 8-SB10 1992						SWMU 8-SB11 1992				SWMU 8-SB12 1992						SWMU 8-SB13 1992		SWMU 8-SB15 1992					
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	0-2	4-6	8-10	12-14	16-18	20-22	0-2	4-6	8-10	0-2	4-6	8-10	12-14	16-18	20-22	2-4	4-6	0-2	4-6	10-12	16-18	20-22		
	Volatile Organic Compounds																										
1,1,1-Trichloroethane	36000	--	640	23	15	--	2.3	0.085	0.039	0.033	0.032	--	--	--	--	--	--	--	--	--	--	--	--	6.3	--	0.012	
1,1-Dichloroethane	16	--	420	--	--	--	--	1.5	--	--	0.077	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
1,2-Dichloroethene (total) ²	2300	--	--	6.9	12	0.066	3.3	1.4	0.034	--	0.074	--	--	0.12	0.092	0.033	--	--	--	--	--	--	--	--	--	--	
2-Butanone	190000	--	28000	--	--	--	--	0.33	--	--	--	--	0.025	0.012	--	0.016	0.027	0.041	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	3000	--	6000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
4-methyl-2-pentanone	56000	--	3400	--	--	0.082	--	0.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Acetone	670000	--	110000	--	--	0.12	--	0.79	0.11	0.15	0.099	0.066	0.1	0.057	0.052	0.06	0.11	0.14	--	1.8	--	--	--	--	--	--	--
Benzene	5.1	0.149	140	--	--	0.28	--	0.24	0.089	--	0.034	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Chlorobenzene	1300	--	760	--	--	--	--	--	--	--	--	--	--	--	0.007	--	--	--	--	--	--	--	--	--	--	--	
Ethylbenzene	25	45.5	480	--	--	--	--	--	0.095	--	0.19	0.12	0.033	--	--	--	--	--	--	--	--	--	--	--	--	--	
Naphthalene	17	39.8	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Tetrachloroethene	100	--	170	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	
Toluene	47000	49.1	820	--	--	0.17	1.4	0.35	--	--	0.39	0.061	0.024	--	--	--	--	--	0.029	--	4.8	--	--	--	--	--	
Trichloroethene	6	--	51	8	22	0.022	3.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Vinyl chloride	1.7	--	50	--	--	0.054	--	0.59	--	--	--	--	--	--	0.043	0.02	--	--	--	--	--	--	--	--	--	--	
Xylenes (Total)	2500	15.7	260	3.9	4.8	0.046	--	0.16	0.36	0.077	0.48	0.33	0.29	--	--	--	--	--	--	1.2	--	--	--	--	--	--	
Semivolatile Organic Compounds																											
Acenaphthene	45000	--	90000	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Anthracene	230000	--	450000	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Benzo(a)anthracene	2.9	11	58	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Benzo[a]pyrene	0.29	1.1	5.8	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Benzo[b]fluoranthene	2.9	11	58	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Benzo[g,h,i]perylene	--	--	--	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Benzo[k]fluoranthene	29	110	580	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
bis(2-Ethylhexyl)Phthalate	160	--	3500	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Chrysene	290	1100	5800	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Dibenzofuran	1000	--	--	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Fluoranthene	30000	--	60000	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Fluorene	30000	--	60000	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Indeno[1,2,3-cd]pyrene	2.9	--	58	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Phenanthrene	--	11	--	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Pyrene	23000	--	45000	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Total Petroleum Hydrocarbons																											
TPH (Total) ^{3,4}	see note 2	see note 3	--	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	
Polychlorinated Biphenyls																											
PCBs (Total) ⁵	1	--	20	7.4	--	15	--	--	--	--	0.63	--	--	--	--	--	--	62	3.2	--	--	--	--	--	--	--	
Metals																											
Aluminum	1100000	--	--	9640	8830	26900	23600	6270	3400	9140	10100	8680	9800	10000	15100	20600	17770	13400	5210	18200	11900	9050	3130	2420	2450		
Antimony	470	--	1600	0.31	0.2	0.13	0.24	0.2	0.16	0.16	0.13	0.17	0.25	--	--	--	0.16	--	0.39	0.19	0.23	0.25	0.41	--	0.23	--	
Arsenic	3	--	77	7.6	7	5.4	11.2	13.6	4.6	9	7.4	7.4	7	2.7	8.2	6.4	7.5	9.4	6.2	5.1	4.6	7.8	5.7	2.3	2.4		
Barium	220000	--	--	62.6	54.5	161	134	291	11.7	44.6	65.8	50.5	62.6	53.8	69.1	131	106	94.4	59.4	111	78.5	42.2	117	8	6.2		
Beryllium	2300	--	7800	0.51	0.43	1.2	1.1	0.24	0.22	0.43	0.52	0.39	0.51	0.58	0.78	1	0.88	0.73	0.5	0.9	0.61	0.48	0.16	0.18	0.18		
Cadmium	980	--	2600	0.79	0.79	0.61	0.66	0.63	0.54	0.67	0.57	0.5	0.88	0.96	0.74	0.89	0.96	0.87	1.9	1	--	--	--	--	--	--	--
Chromium (Total) ⁶	1800000	--	--	18	19.4	28.4	25.9	12	8.1	12.4	12.6	13.4	34.4	12.3	19.7	28.9	34.9	19.4	83.8	22.8	14.8	12.2	9.3	4.5	4		
Cobalt	350	--	--	6.1	4.5	10.6	7																				

Table A-1
Screening of Detected Chemicals in Soil - SWMUs 8 and 12
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU 8/12 SB13A 1992							SWMU 8/12 SB14 1992							SWMU 12-SB1 1992		SWMU 12 SB3 1992		SWMU 12-SS1-94 1994	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	0-2	4-6	8-10	12-14	16-18	20-22	0-2	4-6	8-10	12-14	16-18	2-4	10-12	0-2	8-10	0-0.5				
Volatile Organic Compounds																							
1,1,1-Trichloroethane	36000	--	640	4	9.3	--	12	15	--	0.045	0.006	0.078	0.048	0.058	--	--	0.064	0.016	--	--			
1,1-Dichloroethane	16	--	420	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
1,2-Dichloroethene (total) ²	2300	--	--	--	--	--	--	8.4	--	--	--	--	--	--	--	--	--	--	--	--	--		
2-Butanone	190000	--	28000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2-Methylnaphthalene	3000	--	6000	--	--	--	--	--	--	--	--	--	--	--	--	1.2	--	--	--	--	--		
4-methyl-2-pentanone	56000	--	3400	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Acetone	670000	--	110000	--	--	--	--	--	--	--	--	--	--	--	--	--	0.3	--	--	--	--		
Benzene	5.1	0.149	140	--	--	--	--	--	--	--	--	--	--	--	--	0.73	--	--	--	--	--		
Chlorobenzene	1300	--	760	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Ethylbenzene	25	45.5	480	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Naphthalene	17	39.8	450	--	--	--	--	--	--	--	--	--	--	--	--	2.3	--	--	--	--	--		
Tetrachloroethylene	100	--	170	--	--	--	--	--	--	0.042	0.01	0.058	0.036	0.042	--	--	0.048	0.046	3.6	--	--		
Toluene	47000	49.1	820	--	--	--	--	--	--	--	--	--	--	--	--	0.09	--	--	3.1	--	--		
Trichloroethylene	6	--	51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Vinyl chloride	1.7	--	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Xylenes (Total)	2500	15.7	260	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12	--		
Semivolatile Organic Compounds																							
Acenaphthene	45000	--	90000	na	na	na	na	na	na	na	na	na	na	na	0.64	--	na	na	na	--	na		
Anthracene	230000	--	450000	na	na	na	na	na	na	na	na	na	na	na	2.5	--	na	na	na	--	na		
Benzo(a)anthracene	2.9	11	58	na	na	na	na	na	na	na	na	na	na	na	2.9	--	na	na	na	--	na		
Benzo[a]pyrene	0.29	1.1	5.8	na	na	na	na	na	na	na	na	na	na	na	2.1	--	na	na	na	--	na		
Benzo[b]fluoranthene	2.9	11	58	na	na	na	na	na	na	na	na	na	na	na	4.1	--	na	na	na	--	na		
Benzo[g,h,i]perylene	--	--	--	na	na	na	na	na	na	na	na	na	na	na	0.79	--	na	na	na	--	na		
Benzo[k]fluoranthene	29	110	580	na	na	na	na	na	na	na	na	na	na	na	1.4	--	na	na	na	--	na		
bis(2-Ethylhexyl)Phthalate	160	--	3500	na	na	na	na	na	na	na	na	na	na	na	0.64	--	na	na	na	--	na		
Chrysene	290	1100	5800	na	na	na	na	na	na	na	na	na	na	na	2.4	--	na	na	na	--	na		
Dibenzofuran	1000	--	--	na	na	na	na	na	na	na	na	na	na	na	2.2	--	na	na	na	--	na		
Fluoranthene	30000	--	60000	na	na	na	na	na	na	na	na	na	na	na	5.9	--	na	na	na	--	na		
Fluorene	30000	--	60000	na	na	na	na	na	na	na	na	na	na	na	3.5	--	na	na	na	--	na		
Indeno[1,2,3-cd]pyrene	2.9	--	58	na	na	na	na	na	na	na	na	na	na	na	1.1	--	na	na	na	--	na		
Phenanthrene	--	11	--	na	na	na	na	na	na	na	na	na	na	na	8.9	--	na	na	na	--	na		
Pyrene	23000	--	45000	na	na	na	na	na	na	na	na	na	na	na	6	--	na	na	na	--	na		
Total Petroleum Hydrocarbons																							
TPH (Total) ^{3,4}	see note 2	see note 3	--	4800	410	--	2000	540	--	8600	1600	170	120	--	18000	150	--	92	12000	--	--		
Polychlorinated Biphenyls																							
PCBs (Total) ⁵	1	--	20	390	0.93	--	4.6	2.3	--	100	98	0.89	2.3	--	na	na	na	na	85	--	--		
Metals																							
Aluminum	1100000	--	--	7250	18400	4300	24900	21300	4630	4990	4490	14900	13700	21600	13000	22000	14100	11500	4450	--	--		
Antimony	470	--	1600	0.47	0.24	0.23	--	0.38	0.23	0.55	0.29	0.25	--	0.27	--	--	0.23	0.34	0.32	--	--		
Arsenic	3	--	77	1.7	2.8	2.1	4.9	18.1	2.9	3	2.9	5.2	8.5	5.4	5.2	4.6	7.6	7.3	4.7	--	--		
Barium	220000	--	--	84.8	120	21.1	167	110	32.3	39.6	36.3	98.5	105	142	100	150	121	96.3	33.8	--	--		
Beryllium	2300	--	7800	1	0.95	0.24	1.4	1.2	0.31	0.31	0.28	0.76	0.82	1.1	0.9	0.9	0.8	0.71					

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
BUSTR action level - Class 1 Soil Action Level;
Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs do not have a screening value for total 1,2-dichloroethene, therefore the screening level for cis-1,2-Dichloroethene has been substituted.
- 3) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH(Aromatic High).
- 4) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C_6-C_{12}), 2,000 mg/kg for TPH ($C_{10}-C_{20}$), and 5,000 mg/kg for TPH ($C_{20}-C_{34}$).
- 5) Industrial RSL for PCBs (high risk) applied.
- 6) Industrial RSL for trivalent chromium applied.

Table A-1a
Screening of Detected Chemicals in Soil - SWMUs 8 and 12 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU 12-SS1-92	BD-519-Exc-02
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	1992	2005
				0-0.5	Comp (0-6)
Volatile Organic Compounds					
1,1,1-Trichloroethane	36000	--	640	--	0.008
1,1-Dichloroethane	16	--	420	--	0.015
1,2,4-Trimethylbenzene	240	--	220	--	0.15
1,2-Dichlorobenzene	9300	--	380	--	0.021
1,3,5-Trimethylbenzene	12000	--	98000	--	0.083
4-Isopropyltoluene	--	--	--	--	0.029
Acetone	670000	--	110000	--	0.068
Chlorobenzene	1300	--	760	--	0.007
Chloroethane	--	--	--	--	0.02
Ethylbenzene	25	45.5	480	--	0.007
Isopropylbenzene	17	39.8	450	--	0.006
Naphthalene	17	39.8	450	--	0.18
n-Butylbenzene	58000	--	--	--	0.03
n-Propylbenzene	--	--	--	--	0.01
sec-Butylbenzene	120000	--	--	--	0.015
Tetrachloroethene	100	--	170	--	0.012
Toluene	47000	49.1	820	--	0.025
Xylenes (Total)	2500	15.7	260	--	0.094
Polychlorinated Biphenyls					
PCBs (Total) ²	1	--	20	--	10
Metals					
Arsenic	3	--	77	--	6
Barium	220000	--	--	1.17	73
Cadmium	980	--	2600	--	1.7
Chromium (Total) ³	1800000	--	--	10	20
Lead	800	--	800	15	6
Mercury	40	--	3	0.033	--

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from samples collected during various geotechnical investigation events.

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) Industrial RSL for PCBs (high risk) applied.

3) Industrial RSL for trivalent chromium applied.

Table A-2
Screening of Detected Chemicals in Soil - SWMU 14
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU 14-SB1 1992		SWMU 14-SB2 1992	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	2-4	14-16	2-4	12-14
	Metals						
Aluminum	1100000	--	--	2100	2600	24000	2300
Antimony	470	--	1600	18	14	--	10
Arsenic	3	--	77	--	1.5	6.4	5.8
Barium	220000	--	--	100	110	130	--
Beryllium	2300	--	7800	--	--	1.1	--
Cadmium	980	--	2600	92	--	--	--
Chromium (Total) ²	1800000	--	--	1400	8	29	4
Cobalt	350	--	--	--	--	12	--
Copper	47000	--	160000	300	6	26	7
Cyanide	130	--	1000000	80	--	--	--
Lead	800	--	800	14	12	14	17
Manganese	26000	--	--	120	190	530	260
Nickel	22000	--	74000	1400	39	26	5
Thallium	7	--	--	--	--	--	--
Vanadium	5800	--	23000	12	11	46	13
Zinc	350000	--	1000000	480	22	82	10

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) Industrial RSL for trivalent chromium applied.

Table A-3
Screening of Detected Chemicals in Soil - SWMU 16
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU 16-SB1 1993		SWMU 16-MW2S 1993		SWMU 16-MW3S 1993	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	2-4	4-6	8-10	12-14	8-10	18-20
	Volatile Organic Compounds								
1,1,1-Trichloroethane	36000	--	640	--	--	0.017	0.030	--	--
1,2-Dichloroethene (Total) ²	2300	--	--	--	--	0.009	0.031	0.009	--
2-Butanone	190000	--	28000	--	--	--	--	0.015	--
Acetone	670000	--	110000	0.73	--	0.024	--	0.05	0.023
Trichloroethene	6	--	51	--	--	--	0.27	--	--
Semivolatile Organic Compounds									
Fluoranthene	30000	--	60000	--	--	--	--	0.42	--
Total Petroleum Hydrocarbons									
TPH (Total) ^{3,4}	see note 3	see note 4	--	340	4600	--	--	--	--
Metals									
Aluminum	1100000	--	--	3800	2600	15200	2360	16100	2380
Antimony	470	--	1600	8	--	--	0.18	0.2	0.18
Arsenic	3	--	77	4	2.8	23.5	4.9	7.5	3.2
Barium	220000	--	--	--	--	88.3	8.3	256	7
Beryllium	2300	--	7800	--	--	0.81	0.18	1	0.19
Cadmium	980	--	2600	--	--	0.56	0.76	1.5	0.47
Chromium (Total) ⁵	1800000	--	--	8	7	18.5	3.7	20.5	7.2
Cobalt	350	--	--	--	--	7.7	2.7	11.8	3.9
Copper	47000	--	160000	40	60	19.4	--	13.1	14.8
Lead	800	--	800	9.5	12	17.1	3.6	12.8	5
Manganese	26000	--	--	290	150	208	643	638	144
Nickel	22000	--	74000	18	25	16.7	3.8	16.5	12.8
Selenium	5800	--	20000	--	--	--	--	0.19	0.12
Thallium	7	--	--	--	--	0.34	--	0.15	0.22
Vanadium	5800	--	23000	12	7	25	7	37.7	9.4
Zinc	350000	--	1000000	22	18	63.6	9.5	53.7	24.2

Notes:

- Results and action levels are expressed in mg/kg.

- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs do not have a screening value for total 1,2-dichloroethene, therefore the screening level for cis-1,2-Dichloroethene has been substituted.
- 3) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low),
 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH(Aromatic High).
- 4) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C_6-C_{12}),
 2,000 mg/kg for TPH ($C_{10}-C_{20}$), and 5,000 mg/kg for TPH ($C_{20}-C_{34}$).
- 5) Industrial RSL for trivalent chromium applied.

Table A-3a
Screening of Detected Chemicals in Soil - SWMU 16 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			BD-519-Exc-01 1997		
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	Comp (Unk)	Comp (Unk)	Comp (Unk)
Volatile Organic Compounds						
1,1,1-Trichloroethane	36000	--	640	0.03	--	--
Toluene	47000	49.1	820	0.002	--	--
Xylenes (Total)	2500	15.7	260	0.002	--	--
Total Petroleum Hydrocarbons						
TPH (Total) ^{2,3}	see note 2	see note 3	--	1700	3900	6500
Polychlorinated Biphenyls						
PCBs (Total) ⁴	1	--	20	--	--	--
Metals						
Arsenic	3	--	77	--	--	--
Barium	220000	--	--	110	53	71
Cadmium	980	--	2600	10	2.8	--
Chromium (Total) ⁵	1800000	--	--	160	25	14
Lead	800	--	800	140	15	--
Mercury	40	--	3	18	3.7	0.17

Notes:

- Results and action levels are expressed in mg/kg.

- Analytical results are from samples collected during various geotechnical investigation events.

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low),
440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂),
2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

4) Industrial RSL for PCBs (high risk) applied.

5) Industrial RSL for trivalent chromium applied.

Table A-4
Screening of Detected Chemicals in Soil - SWMU 17
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU 17-SS-1	SWMU 17-SS-2	SWMU 17-SS-3	SWMU 17-SS-4
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	1992	1992	1992	1992
				0-0.5	0-0.5	0-0.5	0-0.5
Volatile Organic Compounds							
Toluene	47000	49.1	820	10	--	--	26
Metals							
Aluminum	1100000	--	--	8400	7500	77000	12000
Arsenic	3	--	77	18	9.2	17	4.3
Barium	220000	--	--	440	210	360	83
Beryllium	2300	--	7800	2.7	1	2.3	0.9
Cadmium	980	--	2600	1.9	--	--	--
Chromium (Total) ²	1800000	--	--	52	17	11	14
Cobalt	350	--	--	32	9	--	10
Copper	47000	--	160000	50	22	32	14
Lead	800	--	800	65	12	8.1	14
Manganese	26000	--	--	320	220	90	940
Mercury	40	--	3	0.3	0.6	--	--
Nickel	22000	--	74000	130	28	14	17
Selenium	5800	--	20000	1.3	1.2	2.3	--
Silver	5800	--	20000	34	--	--	--
Vanadium	5800	--	23000	26	24	34	24
Zinc	350000	--	1000000	87	44	62	47

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).
- '--' denotes non-detection.
- 'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) Industrial RSL for trivalent chromium applied.

Table A-5
Screening of Detected Chemicals in Soil - SWMU 18
GE Aviation - Evendale, Ohio

Sample ID: Sample Date:	Screening Value/Action Level ¹			SWMU 18-MW1S SB			SWMU 18-SB1 1992	SWMU 18-SB2			SWMU 18-SB3 1992	SWMU 18-SB4			SWMU 18-SS1 1992	SWMU 18-SS2 1992	SWMU 18-SS3 1992	SWMU 18-SS4 1992	SWMU 18-SS5 1992	SWMU 18-SS6 1992
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	6-8	8-10	26-28	COMP	COMP	4-6	16-18	COMP	COMP	14-16	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	
Volatile Organic Compounds																				
1,1,1-Trichloroethane	36000	--	640	--	na	--	na	na	na	na	na	na	na	na	na	na	na	na	na	
Acetone	670000	--	110000	--	na	--	na	na	na	na	na	na	na	na	na	na	na	na	na	
Methylene Chloride	1000	--	3300	--	na	--	na	na	na	na	na	na	na	na	na	na	na	na	na	
Naphthalene	17	39.8	450	--	4.7	--	na	na	na	na	na	na	na	na	na	na	na	na	na	
Toluene	47000	49.1	820	--	na	--	na	na	na	na	na	na	na	na	na	na	na	na	na	
Total Petroleum Hydrocarbons																				
TPH (Total) ^{2,3}	see note 2	see note 3	--	na	na	na	na	na	2700	340	na	na	2400	na	na	na	na	na	na	
Metals																				
Aluminum	1100000	--	--	na	na	na	7100	5700	na	na	11000	8900	na	na	na	na	na	na	na	
Antimony	470	--	1600	na	na	na	--	10	na	na	--	--	na	na	na	na	na	na	na	
Arsenic	3	--	77	na	na	na	6.7	17	na	na	13	11	na	na	na	na	na	na	na	
Barium	220000	--	--	na	na	na	130	120	na	na	210	160	na	na	na	na	na	na	na	
Beryllium	2300	--	7800	na	na	na	1	1	na	na	1.9	1.8	na	0.7	0.7	1.5	0.8	0.8	0.7	
Cadmium	980	--	2600	na	na	na	--	0.7	na	na	--	8	na	na	na	na	na	na	na	
Chromium (Total) ⁴	1800000	--	--	na	na	na	12	27	na	na	40	37	na	na	na	na	na	na	na	
Cobalt	350	--	--	na	na	na	6	7	na	na	12	9	na	na	na	na	na	na	na	
Copper	47000	--	160000	na	na	na	21	28	na	na	60	28	na	na	na	na	na	na	na	
Lead	800	--	800	na	na	na	16	42	na	na	36	38	na	na	na	na	na	na	na	
Manganese	26000	--	--	na	na	na	490	500	na	na	340	350	na	na	na	na	na	na	na	
Mercury	40	--	3	na	na	na	--	0.5	na	na	0.2	6.3	na	na	na	na	na	na	na	
Nickel	22000	--	74000	na	na	na	18	25	na	na	84	24	na	na	na	na	na	na	na	
Selenium	5800	--	20000	na	na	na	2.3	1	na	na	1.6	1.6	na	na	na	na	na	na	na	
Silver	5800	--	20000	na	na	na	--	--	na	na	--	4	na	na	na	na	na	na	na	
Vanadium	5800	--	23000	na	na	na	23	21	na	na	34	31	na	na	na	na	na	na	na	
Zinc	350000	--	1000000	na	na	na	48	130	na	na	66	66	na	na	na	na	na	na	na	

Notes:

- Results and action levels are expressed in mg/kg.

- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

-- denotes non-detect.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH(Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂),

2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

4) Industrial RSL for trivalent chromium applied.

Table A-6
Screening of Detected Chemicals in Soil - SWMU 19
GE Aviation - Evendale, Ohio

Sample ID: Sample Date:	Screening Value/Action Level ¹			SWMU 19-SB1 1993		SWMU 19-SB2 1993		SWMU 19-SB3 1993		SWMU 19-SB4 1993		SWMU 19-SS1 1993	SWMU 19-SS2 1993	SWMU 19-SS3 1993	SWMU 19-SS4 1993
	Depth (ft bgs): USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	10-12	12-14	14-16	16-18	10-12	12-14	4-6	8-10	0-0.5	0-0.6	0-0.7	0-0.8
Volatile Organic Compounds															
1,1,1-Trichloroethane	36000	--	640	--	--	0.008	0.04	0.006	--	--	0.006	--	--	--	--
Acetone	670000	--	110000	0.018	--	0.011	0.014	0.016	0.017	--	0.014	--	--	--	--
Methylene Chloride	1000	--	3300	0.007	--	--	--	0.008	0.006	--	0.005	--	--	--	--
Toluene	47000	49.1	820	0.008	--	--	--	0.011	--	--	--	--	--	--	0.012
Metals															
Aluminum	1100000	--	--	2800	2700	3100	2600	4800	2200	20000	2400	na	na	na	na
Arsenic	3	--	77	5	4.3	1.3	1.8	6.6	6.4	2.1	1.1	na	na	na	na
Barium	220000	--	--	--	--	24	14	21	--	370	--	na	na	na	na
Beryllium	2300	--	7800	--	--	--	--	--	--	0.9	--	1.7	1.6	2	2.2
Chromium (Total) ²	1800000	--	--	6	7	6	5	8	5	23	4	na	na	na	na
Cobalt	350	--	--	--	--	--	--	--	--	17	--	na	na	na	na
Copper	47000	--	160000	9	6	10	12	13	6	19	4	na	na	na	na
Lead	800	--	800	3.8	3.4	4.3	3.8	5	4.4	13	3	na	na	na	na
Manganese	26000	--	--	230	200	430	190	170	150	2800	200	na	na	na	na
Nickel	22000	--	74000	7	5	7	8	10	8	22	--	na	na	na	na
Silver	5800	--	20000	--	--	--	--	--	--	1	--	na	na	na	na
Vanadium	5800	--	23000	17	14	18	14	20	13	53	12	na	na	na	na
Zinc	350000	--	1000000	15	13	23	18	18	14	63	10	na	na	na	na

Notes:

- Results and action levels are expressed in mg/kg.

- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) Industrial RSL for trivalent chromium applied.

Table A-7
Screening of Detected Chemicals in Soil - SWMU 20
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ^f			SWMU 20 MW-1S SB 1993		SWMU 20 SB1 1993		SWMU 20 SB2 1993		SWMU 20 SB3 1993		SWMU 20 SB4 1993		SWMU 20 SB5 1993		
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	0-2	6-8	10-12	12-14	2-4	10-12	2-4	12-14	2-4	12-14	2-4	8-10	10-12
Volatile Organic Compounds																
Acetone	670000	--	110000	0.23	--	0.045	--	--	--	--	0.017	--	--	--	--	--
Toluene	47000	49.1	820	--	--	--	--	--	--	0.007	--	--	--	--	--	--
Trichloroethene	6	--	51	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes (Total)	2500	15.7	260	9	--	--	--	--	--	--	--	--	--	--	--	--
Semi-volatile Organic Compounds																
Anthracene	230000	--	450000	--	--	--	--	--	--	--	--	--	--	--	--	--
Benz[a]anthracene	2.9	11	58	0.39	--	--	--	--	--	--	--	--	--	--	--	--
Benz[a]pyrene	0.29	1.1	5.8	0.36	--	--	--	--	--	--	--	--	--	--	--	--
Benz[b]anthracene	2.9	11	58	0.54	--	--	--	--	--	--	--	--	--	--	--	--
Benz[g,h]perylene	--	--	--	0.23	--	--	--	--	--	--	--	--	--	--	--	--
Benz[k]fluoranthene	29	110	580	0.21	--	--	--	--	--	--	--	--	--	--	--	--
bis(2-Ethyhexyl)Phthalate	160	--	3500	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	290	1100	5800	0.41	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	30000	--	60000	1.1	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	30000	--	60000	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	2.9	--	58	0.27	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	--	11	--	0.85	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	23000	--	45000	0.88	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons																
TPH (Total) ^{g,h}	see note 2	see note 3	--	na	na	--	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	1100000	--	--	na	na	2000	1800	14000	2300	17000	2000	15000	2300	15000	4000	2400
Arsenic	3	--	77	na	na	3.5	2.5	7.8	2.9	4.9	2.9	6.9	2.8	5.3	4.2	3.3
Boron	220000	--	--	na	na	--	120	--	130	--	110	--	120	--	--	--
Beryllium	2300	--	7800	na	na	--	1	--	1	--	1	--	0.9	--	--	--
Cadmium	980	--	2600	na	na	--	--	--	--	--	--	--	--	--	--	--
Chromium (Total) ⁱ	1800000	--	--	na	na	4	4	18	5	20	4	19	4	18	7	5
Cobalt	350	--	--	na	na	--	--	8	--	10	--	9	--	9	--	--
Copper	47000	--	160000	na	na	7	6	13	8	14	5	18	8	14	20	8
Lead	800	--	800	na	na	5.2	2.6	18	3.6	11	2.6	11	3.9	16	7.8	4
Manganese	26000	--	--	na	na	140	150	500	160	580	130	630	140	2900	160	150
Mercury	40	--	3	na	na	--	--	--	--	--	--	--	--	--	--	--
Nickel	22000	--	74000	na	na	5	--	15	6	16	--	19	5	15	13	7
Silver	5800	--	20000	na	na	--	--	--	--	--	--	--	--	--	--	--
Vanadium	5800	--	23000	na	na	12	11	31	12	33	13	32	14	30	13	13
Zinc	350000	--	1000000	na	na	18	14	64	19	53	16	58	12	68	41	19
Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ^f			SWMU 20 SB6 1993		SWMU 20 SB7 1993		SWMU 20 SB8 1993		SWMU 20 SB9 1993		SWMU 20 SB10 1993		SWMU 20 SB11 1993		
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	4-6	12-14	2-4	8-10	2-4	14-16	2-4	10-12	2-4	8-10	2-4	8-10	2-4
Volatile Organic Compounds																
Acetone	670000	--	110000	--	--	0.066	0.044	--	0.052	--	0.054	--	--	--	--	--
Toluene	47000	49.1	820	--	--	0.040	0.008	--	0.006	--	0.006	--	--	--	--	--
Trichloroethene	6	--	51	--	--	--	0.024	--	--	--	--	--	--	--	--	--
Xylenes (Total)	2500	15.7	260	--	--	--	--	--	--	--	--	--	--	--	--	--
Semi-volatile Organic Compounds																
Anthracene	230000	--	450000	--	--	0.9	--	--	--	--	--	--	--	--	--	--
Benz[a]anthracene	2.9	11	58	--	--	--	--	2.9	--	--	--	--	--	--	--	--
Benz[a]pyrene	0.29	1.1	5.8	--	--	--	--	2.5	--	--	--	--	--	--	--	--
Benz[b]fluoranthene	2.9	11	58	--	--	--	--	4.6	--	--	--	--	--	--	--	--
Benz[g,h]perylene	--	--	--	--	--	--	--	1.1	--	--	--	--	--	--	--	--
Benz[k]fluoranthene	29	110	580	--	--	--	--	1.3	--	--	--	--	--	--	--	--
bis(2-Ethyhexyl)Phthalate	160	--	3500	--	--	0.440	--	--	--	--	--	--	--	--	--	--
Chrysene	290	1100	5800	--	--	--	--	2.1	--	--	--	--	--	--	--	--
Fluoranthene	30000	--	60000	--	--	--	--	3.5	--	--	--	--	--	--	--	--
Fluorene	30000	--	60000	--	--	--	--	0.450	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	2.9	--	58	--	--	--	--	1.6	--	--	--	--	--	--	--	--
Phenanthrene	--	11	--	--	--	--	--	2.7	--	--	--	--	--	--	--	--
Pyrene	23000	--	45000	--	--	--	--	5.0	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons																
TPH (Total) ^{g,h}	see note 2	see note 3	--	--	--	--	170	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	1100000	--	--	15000	1600	12000	16000	18000	2500	16000	5900	21000	4400	--	--	--
Arsenic	3	--	77	6.4	2.7	4.9	6.2	8.2	3	4.1	6.1	9	9.3	--	--	--
Barium	220000	--	--	180	--	110	240	110	180	130	37	120	46	--	--	--
Beryllium	2300	--	7800	1	--	0.7	0.9	0.9	--	0.9	--	0.8	--	--	--	--
Cadmium	980	--	2600	--	--	--	--	1.5	--	--	--	--	--	--	--	--
Chromium (Total) ⁱ	1,800,000	--	--	30	3	20	26	21	5	20	9	26	8	--	--	--
Cobalt	350	--	--	16	--	--	9	11	--	10	6	14	10	--	--	--
Copper	47000	--	160000	45	6	170	120	16	8	15	15	19	14	--	--	--
Lead	800	--	800	26	3.2	31	44	20	4.4	13	7.9	13	7.6	--	--	--
Manganese	26000	--	--	810	140	380	500	440	190	700	380	620	1500	--	--	--
Mercury	40	--	3	0.30	--	0.2	1.2	--	--	--	--	--	--	--	--	--
Nickel	220000	--	74000	36	--	73	53	18	6	18	16	23	20	--	--	--
Silver	5800	--	20000	--	--	--	1	--	--	--	--	--	--	--	--	--
Vanadium	5800	--	23000	34	11	22	33	35	14	32	20	45	16	--	--	--
Zinc	350000	--	1000000	110	14	170	210	64	22	56	45	80	35	--	--	--

Notes:

- Results and action levels are expressed in mg/kg.

- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

-- denotes non-detection.

bgs - below ground surface.

na - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₂-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

4) Industrial RSLs for trivalent chromium applied.

Table A-8
Screening of Detected Chemicals in Soil - SWMUs 21 and 22
GE Aviation - Evendale, Ohio

Sample ID: Sample Date:	Screening Value/Action Level ¹			SWMU 21-SB1 1993		SWMU 21-SB2 1993		SWMU 21-SB3 1993		SWMU 21-SB4 1993		SWMU 21-SB5 1993		SWMU 21/22-MW-1S SB 1993			
				USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	16-18	18-20	2-4	16-18	12-14	18-20	4-6	16-18	8-10	12-14	12-14
Volatile Organic Compounds																	
1,1,1-Trichloroethane	36000	--	640	--	--	--	--	--	--	--	--	--	--	--	--	0.008	
1,2-Dichloroethene (Total) ²	2300	--	--	--	--	--	--	0.31	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	9300	--	310	--	0.98	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	190000	--	28000	--	--	--	--	--	--	--	--	--	0.028	0.022	--	0.22	--
Acetone	670000	--	110000	--	--	0.044	--	--	--	--	--	--	--	--	--	--	--
Carbon Disulfide	3500	--	740	--	--	--	--	--	--	--	--	--	0.007	--	--	--	--
Trichloroethylene	6	--	51	14	20	--	--	0.1	--	0.13	--	--	--	--	--	--	--
Vinyl chloride	1.7	--	50	--	--	--	--	0.14	--	--	--	--	--	--	--	--	--
Xylenes (Total)	2500	15.7	260	--	--	--	--	--	--	--	--	--	0.54	0.033	--	--	--
Semivolatile Organic Compounds																	
Acenaphthene	45000	--	90000	--	--	0.4	--	--	--	--	--	--	--	--	--	--	--
Anthracene	230000	--	450000	--	--	0.5	--	--	--	--	--	--	--	--	--	--	--
Benz[a]anthracene	2.9	11	58	--	--	1.8	--	--	--	--	--	--	--	--	--	--	--
Benz[a]pyrene	0.29	1.1	5.8	--	--	0.97	--	--	--	--	--	--	--	--	--	--	--
Benz[b]fluoranthene	2.9	11	58	--	--	3.4	--	--	--	--	--	--	--	--	--	--	--
Benz[g,h,i]perylene	--	--	--	--	--	1.6	--	--	--	--	--	--	--	--	--	--	--
Benz[k]fluoranthene	29	110	580	--	--	1.1	--	--	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)Phthalate	160	--	3500	9.7	14	--	1.7	--	--	--	--	--	--	--	--	--	--
Chrysene	290	1100	5800	--	--	1.8	--	--	--	--	--	--	--	--	--	--	--
Dibenz[a,h]anthracene	29	1.1	5.8	--	--	0.37	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	30000	--	60000	--	--	2.2	--	--	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	2.9	--	58	--	--	1.5	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	--	11	--	--	--	2.4	--	--	--	--	--	--	--	--	--	--	--
Pyrene	23000	--	45000	--	--	7	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons																	
TPH (Total) ^{3,4}	see note 2	see note 3	--	3800	680	7700	230	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls																	
PCBs (Total) ⁵	1	--	20	3	2.5	9	--	--	--	--	--	--	--	3.0	--	--	
Metals																	
Aluminum	1100000	--	--	7500	5800	21000	3300	3530	3990	1740	8980	21200	20000	5600	2230		
Antimony	470	--	1600	25	50	10	19	10.6	11.8	--	10.4	--	3.1	9.2	10.5		
Arsenic	3	--	77	3.3	2.1	5.5	1.3	9	1.9	0.89	3.4	9.6	6.5	6.2	0.85		
Barium	220000	--	--	110	130	280	110	11.8	11.4	8.8	47.3	121	113	21.8	7.2		
Beryllium	2300	--	7800	--	--	3	--	0.35	0.66	0.20	0.71	1.1	1.2	0.7	0.36		
Cadmium	980	--	2600	42	210	1.8	65	--	--	--	0.27	0.27	--	--	--		
Chromium (Total) ⁶	1800000	--	--	760	4800	53	1300	19.3	26.5	11.3	253	24	30.3	19.1	6.3		
Cobalt	350	--	--	--	95	12	12	2.5	3	0.82	3.7	7.5	9.1	6.1	1.3		
Copper	47000	--	160000	1400	5100	51	710	37.3	--	--	--	--	--	--	--		
Cyanide	130	--	1000000	1400	1500	--	--	--	--	--	--	--	--	--	--		
Lead	800	--	800	63	140	77	44	4.7	8.8	3.3	8.2	13.1	20.5	3.6	5.2		
Manganese	26000	--	--	130	180	1600	110	255	173	31.1	279	207	351	150	124		
Mercury	40	--	3	0.20	--	--	--	--	--	--	--	--	--	--	--		
Nickel	22000	--	74000	4200	38000	63	4600	16.4	16.2	--	18.5	17.4	23.8	23.2	--		
Selenium	5800	--	20000	--	--	--	--	--	--	--	--	--	--	0.58	--		
Silver	5800	--	20000	--	--	2	--	--	--	--	--	--	--	--	--		
Thallium	7	--	--	--	--	--	--	--	0.11	--	0.12	0.24	0.17	--	--		
Vanadium	5800	--	23000	17	18	26	16	15.6	16.6	4	22.1	37.9	36.3	19	11.8		
Zinc	350000	--	1000000	400	3000	130	520	12.2	23.3	7.5	28.5	49.3	90.5	18.9	11.3		

Notes:

- Results and action levels are expressed in mg/kg.
 - Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).
 - '-' denotes non-detection.
 - 'bgs' - below ground surface.
 - 'na' - not analyzed for this constituent.
 - Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.
- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs do not have a screening value for total 1,2-dichloroethene, therefore the screening level for cis-1,2-dichloroethene has been substituted.
- 3) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 4) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).
- 5) Industrial RSL for PCBs (high risk) applied.
- 6) Industrial RSL for trivalent chromium applied.

Table A-8a
Screening of Detected Chemicals in Soil - SWMUs 21 and 22 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 21/22-MW-1S SB
Sample Date:	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	1993
Depth (ft bgs):				12-14
Volatile Organic Compounds				
VOCs (Total)	--	--	--	--
Semivolatile Organic Compounds				
Anthracene	230000	--	450000	0.59
Benzo[a]anthracene	2.9	11	58	2.4
Benzo[a]pyrene	0.29	1.1	5.8	3
Benzo[b]fluoranthene	2.9	11	58	3.1
Benzo[g,h,i]perylene	--	--	--	2
Benzo[k]fluoranthene	29	110	580	1.3
Chrysene	290	1,100	5800	2.2
Dibenz[a,h]anthracene	29	1.1	5.8	0.54
Fluoranthene	30000	--	60000	5.1
Indeno[1,2,3-cd]pyrene	2.9	--	58	1.7
Phenanthrene	--	11	--	1.8
Pyrene	23000	--	45000	4.5
Polychlorinated Biphenyls				
PCBs (Total) ²	1	--	20	4.1
Metals				
Mercury	40	--	3	0.54
Barium	220000	--	--	65
Chromium (Total) ³	1800000	--	--	17

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from samples collected during various geotechnical investigation events.
- '--' denotes non-detection.
- 'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) Industrial RSL for PCBs (high risk) applied.
- 3) Industrial RSL for trivalent chromium applied.

Table A-9
Screening of Detected Chemicals in Soil - SWMUs 27 and 28
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU 27/28-SB1		SWMU 27/28 MW-1S SB	
				1993		1993	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	6-8	12-14	10-12	12-14
Volatile Organic Compounds							
1,1,1-Trichloroethane	36000	--	640	0.2	--	--	--
2-Butanone	190000	--	28000	--	0.014	--	--
Acetone	670000	--	110000	0.15	0.038	--	--
Benzene	5.1	0.149	140	0.019	--	--	--
Methylene Chloride	1000	--	3300	0.017	--	--	--
Naphthalene	17	39.8	450	--	--	--	--
Toluene	47000	49.1	820	0.66	--	--	--
Trichloroethene	6	--	51	0.073	--	--	--
Metals							
Aluminum	1100000	--	--	10000	12000	na	na
Arsenic	3	--	77	20	13	na	na
Barium	220000	--	--	300	180	na	na
Beryllium	2300	--	7800	2.8	2	na	na
Chromium (Total) ²	1800000	--	--	14	16	na	na
Cobalt	350	--	--	11	9	na	na
Copper	47000	--	160000	24	21	na	na
Lead	800	--	800	12	14	na	na
Manganese	26000	--	--	420	240	na	na
Nickel	11000	--	74000	19	17	na	na
Selenium	5800	--	20000	--	1.8	na	na
Vanadium	5800	--	23000	40	33	na	na
Zinc	350000	--	1000000	36	48	na	na

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) Industrial RSL for trivalent chromium applied.

Table A-10
Screening of Detected Chemicals in Soil - SWMU 29
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU 29 SB-1 1993		
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	2-4	8-10	10-12
Volatile Organic Compounds						
1,1,1-Trichloroethane	36000	--	640	--	--	--
2-Butanone	190000	--	28000	--	--	--
Acetone	670000	--	110000	0.031	0.11	0.082
Benzene	5.1	0.149	140	--	--	--
Methylene Chloride	1000	--	3300	0.012	0.017	0.010
Toluene	47000	49.1	820	--	--	--
Trichloroethene	6	--	51	--	--	--
Total Petroleum Hydrocarbons						
TPH (Total) ^{2,3}	see note 2	see note 3	--	--	170	--
Metals						
Aluminum	1100000	--	--	4700	4600	24000
Arsenic	3	--	77	4.5	--	5.4
Barium	220000	--	--	86	140	320
Beryllium	2300	--	7800	--	1	2.4
Chromium (Total) ⁴	1800000	--	--	8	4	21
Cobalt	350	--	--	--	--	22
Copper	47000	--	160000	12	8	20
Lead	800	--	800	69	6.1	40
Manganese	26000	--	--	70	60	2500
Nickel	11000	--	74000	--	--	28
Selenium	5800	--	20000	--	--	--
Vanadium	5800	--	23000	22	16	45
Zinc	350000	--	1000000	70	35	56

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).
- 4) Industrial RSL for trivalent chromium applied.

Table A-11
Screening of Detected Chemicals in Soil - SWMU 31
GE Aviation - Evendale, Ohio

Sample ID: Sample Date:	Screening Value/Action Level ¹			SWMU 31 SB-1 1993	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	10-12	12-14
Volatile Organic Compounds					
1,1,1-Trichloroethane	36000	--	640	--	--
2-Butanone	190000	--	28000	--	0.018
Acetone	670000	--	110000	0.14	0.096
Methylene Chloride	1000	--	3,300	0.008	0.01
Semivolatile Organic Compounds					
Pyrene	23,000	--	45,000	--	0.81
Total Petroleum Hydrocarbons					
TPH (Total) ^{2,3}	see note 2	see note 3	--	160	780
Metals					
Aluminum	1100000	--	--	11000	9000
Antimony	470	--	1,600	10	--
Arsenic	3	--	77	2.9	8.5
Barium	220000	--	--	110	360
Beryllium	2300	--	7800	1.1	2.1
Chromium (Total) ⁴	1800000	--	--	13	17
Copper	47000	--	160000	18	27
Lead	800	--	800	18	53
Manganese	26000	--	--	120	120
Nickel	11000	--	74000	15	74
Selenium	5800	--	20000	--	1.5
Vanadium	5800	--	23000	20	37
Zinc	350000	--	1000000	38	56

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).
- '--' denotes non-detection.
- 'bgs' - below ground surface.
- 'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low),
 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂),
 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).
- 4) Industrial RSL for trivalent chromium applied.

Table A-12
Screening of Detected Chemicals in Soil - SWMU 42
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SS-20 SB1 1993	
Sample Date:	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	6-8	18-20
Volatile Organic Compounds					
Acetone	670000	--	110000	0.05	--
Trichloroethene	6	--	51	--	0.33
Metals					
Cadmium	980	--	2600	4.7	1.7

Notes:

- Results and action levels are expressed in mg/kg.
 - Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).
 - '--' denotes non-detection.
 - 'bgs' - below ground surface.
- Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

Table A-13
Screening of Detected Chemicals in Soil - SWMU 61
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 61/67 SB1		SWMU 61/67MW-2S		SWMU 61/67 MW-3S	
				1993		1993		1993	
Sample Date:				18-20	20-22	16-18	18-20	16-18	18-20
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP						
Volatile Organic Compounds									
Acetone	670000	--	110000	0.011	0.12	--	--	--	--

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

Table A-14
Screening of Detected Chemicals in Soil - SWMU 79
GE Aviation - Evendale, Ohio

Sample ID:				SWMU 79-SS1 1993	SWMU 79-SS2 1993	SWMU 79-SS3 1993	SWMU 79-SS4 1993	SWMU 79-SS5 1993	SWMU 79-SS6 1993	SWMU 79-SS7 1993	SWMU 79-SS8 1993	SWMU 79-SS9 1993
Sample Date:	Screening Value/Action Level ¹											
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Metals												
Beryllium	2300	--	7800	--	--	--	--	--	--	--	--	0.9
Cadmium	980	--	2600	--	320	--	--	--	--	--	--	--

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

Table A-15
Screening of Detected Chemicals in Soil - SWMU 86
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU 86-MW4S SB 1994	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	16-18	18-20
Volatile Organic Compounds					
1,1,1-Trichloroethane	36000	--	640	0.1	0.079
Tetrachloroethene	100	--	170	--	0.007
Trichloroethene	6	--	51	0.18	0.099
Metals					
Arsenic	3	--	77	1.9	2
Cobalt	350	--	--	1.7	2.4

Notes:

- Results and action levels are expressed in mg/kg.
 - Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).
 - '--' denotes non-detection.
 - 'bgs' - below ground surface.
- Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

Table A-15a
Screening of Detected Chemicals in Soil - SWMU 86 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			BD-300-Exc-01 1999	BD-300-Exc-02 2005
Sample Date:	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	Comp (Unk)	Comp (Unk)
Volatile Organic Compounds					
1,1,1-Trichloroethane	36000	--	640	0.91	na
Polychloronated Biphenyls					
PCBs (Total) ²	1	--	20	--	5

Notes:

- Results and action levels are expressed in mg/kg.
 - Analytical results are from samples collected during various geotechnical investigation events.
 - '--' denotes non-detection.
 - 'bgs' - below ground surface.
 - 'na' - not analyzed for this constituent.
- Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) Industrial RSL for PCBs (high risk) applied.

Table A-16
Screening of Detected Chemicals in Soil - SWMUs 87 and 88
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 87/88-SB1	
Sample Date:				1993	
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	2-4	12-14
Volatile Organic Compounds					
Acetone	670000	--	110000	--	0.013
Total Petroleum Hydrocarbons					
TPH (Total) ^{2,3}	see note 2	see note 3	--	120	100
Polychlorinated Biphenyls					
PCBs (Total) ⁴	1	--	20	1.53	--
Metals					
Arsenic	3	--	77	7	6.5
Cobalt	350	--	--	7.2	3.3

Notes:

- Results and action levels are expressed in mg/kg.
 - Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).
 - '--' denotes non-detection.
 - 'bgs' - below ground surface.
- Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low),
 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂),
 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).
- 4) Industrial RSL for PCBs (high risk) applied.

Table A-16a
Screening of Detected Chemicals in Soil - SWMUs 87 and 88 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			BD-303-Exc-03 1993	BD-401-Exc-04 2008	BD-401-Exc-05 2008	BD-401-SS-08 2009
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	Comp (0-2)	Comp (0-3)	Comp (0-7)	Comp (Ukn)
Volatile Organic Compounds							
Total VOCs	670000	--	110000	na	na	--	na
Polychloronated Biphenyls							
PCBs (Total) ²	1	--	20	6.5	na	--	--
Metals							
Arsenic	3	--	77	8.4	7.8	--	--
Barium	220000	--	--	34	34	14	47
Cadmium	980	--	2600	--	--	--	7.5
Chromium (Total)	--	--	--	19	18	--	560
Lead	800	--	800	32	8.9	--	44
Mercury	40	--	3	40	--	--	--

Notes:

- Results and action levels are expressed in mg/kg.
 - Analytical results are from samples collected during various geotechnical investigation events.
 - '--' denotes non-detection.
 - 'bgs' - below ground surface.
 - 'na' - not analyzed for this constituent.
- Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) Industrial RSL for PCBs (high risk) applied.

Table A-17
Screening of Detected Chemicals in Soil - SWMUs 93 and 94
GE Aviation - Evendale, Ohio

Sample ID: Sample Date:	Screening Value/Action Level ¹			SWMU Tank 500-1-SB1 1993		SWMU 93/94-MW2S 1993	
	Depth (ft bgs): USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	2-4	16-18	8-10	14-16
Volatile Organic Compounds							
Acetone	670000	--	110000	0.023	na	0.74	0.49
Benzene	5.1	0.149	140	--	na	0.048	0.16
Ethylbenzene	25	45.5	480	--	na	0.075	--
Total Petroleum Hydrocarbons							
TPH (Total) ^{2,3}	see note 2	see note 3	--	--	--	480	430
Metals							
Arsenic	3	--	77	na	na	7.3	7.3
Beryllium	2300	--	7800	na	na	1.1	1.2
Cobalt	350	--	--	na	na	6.9	9.2

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995)

'--' denotes non-detection.

'bgs' - denotes 'below ground surface'

'na' denotes Not Analyzed.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH(Aromatic Low), 440 mg/kg for TPH(Aliphatic Medium), and 33,000 mg/kg for TPH(Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH(C₆-C₁₂), 2,000 mg/kg for TPH(C10-C20), and 5,000 mg/kg for TPH(C20-C34).

Table A-17a
Screening of Detected Chemicals in Soil - SWMUs 93 and 94 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID: Sample Date:	Screening Value/Action Level ¹			BD-517-Exc-01 6/6/2001				BD-517-SB-02 SE Aug 2000		BD-517-SB-02 NE Aug 2000		BD-517-SB-02 SW Aug 2000		BD-517-SB-02 SW Aug 2000	
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	Comp 01	Comp 02	Comp 03	Comp 04	2-4	2-4	5-7	2-4	5-7	2-4	5-7	Composite
Volatile Organic Compounds															
Acetone	670000	--	110000	0.064	--	--	--	0.084	--	--	--	0.059	0.061	0.087	na
Isopropylbenzene	--	--	--	--	0.008	--	--	--	--	--	--	--	--	--	na
Naphthalene	17	39.8	450	--	0.009	--	--	--	--	--	--	--	--	--	na
n-Propylbenzene	--	--	--	--	0.006	--	--	--	--	--	--	--	--	--	na
sec-Butylbenzene	120000	--	--	--	0.006	--	--	--	--	--	--	--	--	--	na
Total Petroleum Hydrocarbons															
TPH (Total) ^{2,3}	see note 2	see note 3	--	--	--	--	--	--	--	--	--	--	--	--	na
Polychlorinated Biphenyls															
PCBs (Total) ⁴	1	--	20	1.05	0.04	0.27	0.7	--	--	--	2.2	--	0.39	0.58	--
Metals															
Arsenic	3	--	77	--	--	--	--	--	--	--	6	--	12	--	na
Barium	220000	--	--	52	56	44	48	17	33	15	67	66	71	72	na
Chromium (Total) ⁵	1800000	--	--	37	10	7.4	9.2	6.1	15	1.8	9.7	9.9	10	8.6	na
Lead	800	--	800	20	11	8	11	4.4	4.7	3.3	11	10	11	10	na
Mercury	40	--	3.1	0.6	--	--	--	--	--	--	--	--	--	--	na
Selenium	5800	--	20000	--	--	8.6	8.6	--	--	--	--	--	--	--	na

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from samples collected during various geotechnical investigation events.
- denotes non-detection.
- bgs' - below ground surface.
- 'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

4) Industrial RSL for PCBs (high risk) applied.

5) Industrial RSL for trivalent chromium applied.

Table A-18
Screening of Detected Chemicals in Soil - SWMU 95
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 95 MW-3S SB	
	1993			12-14	16-18
Sample Date:	USEPA Industrial Soil RSLs			BUSTR	Ohio VAP
Depth (ft bgs):					
Volatile Organic Compounds					
1,1,1-Trichloroethane	36000	--	640	0.022	--
Tetrachloroethene	100	--	170	0.012	--
Toluene	47000	49.1	820	0.009	--
Trichloroethene	6	--	51	0.029	--
Metals					
Arsenic	3	--	77	3	2.5
Beryllium	2300	--	7800	0.56	0.64
Cobalt	350	--	--	3.3	2.1

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

Table A-18a
Screening of Detected Chemicals in Soil - SWMU 95 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 95 MW-3S SB	BD-707-Exc-07
Sample Date:				1993	2005
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	12-14	Comp (0-3.5)
Volatile Organic Compounds					
Total VOCs	6	--	51	na	--
Polychloronated Biphenyls					
PCBs (Total)	1	--	20	--	--
Metals					
Arsenic	3	--	77	--	5.9
Barium	220000	--	--	88	32
Chromium (Total) ²	1800000	--	--	11	10
Lead	800	--	800	7.6	11

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from samples collected during various geotechnical investigation events.
- '--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) Industrial RSL for trivalent chromium applied.

Table A-19
Screening of Detected Chemicals in Soil - SWMUs 98 and 99
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 98/99 MW-1S SB 1993	
Sample Date:	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	12-14	14-16
Volatile Organic Compounds					
1,1,1-Trichloroethane	36000	--	640	0.02	0.053
Trichloroethene	6	--	51	0.29	0.77
Total Petroleum Hydrocarbons					
TPH (Total) ^{2,3}	see note 2	see note 3	--	130	64
Metals					
Arsenic	3	--	77	2.6	2.9
Cobalt	350	--	--	1.5	2.1

Notes:

- Results and action levels are expressed in mg/kg.
 - Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).
 - '--' denotes non-detection.
 - 'bgs' - below ground surface.
- Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.
- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-20
Screening of Detected Chemicals in Soil - SWMU 100
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 100 MW-5S SB	
Sample Date:				1993	
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	12-14	14-16
Volatile Organic Compounds					
1,1,1-Trichloroethane	36000	--	640	--	0.014
1,1-Dichloroethane	16	--	420	--	0.01
1,2-Dichloroethene (total) ²	2300	--	--	--	0.006
Trichloroethene	6	--	51	0.012	0.016
Total Petroleum Hydrocarbons					
TPH (Total) ^{3,4}	see note 2	see note 3	--	--	na
Metals					
Arsenic	3	--	77	5	5.7
Cobalt	350	--	--	3.4	3.2

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs do not have a screening value for total 1,2-Dichloroethene,
 therefore the screening level for cis-1,2-Dichloroethene has been substituted.
- 3) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low),
 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀),
 and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-20a
Screening of Detected Chemicals in Soil - SWMU 100 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			BD-707-Exc-01
Sample Date:				1999
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	Comp (Unk)
Volatile Organic Compounds				
1,1,1-Trichloroethane	36000	--	640	--
Polychloronated Biphenyls				
PCBs (Total) ²	1	--	20	--

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).
- '--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) Industrial RSL for PCBs (high risk) applied.

Table A-21
Screening of Detected Chemicals in Soil - SWMU 122
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 122-MW1S SB	
	Sample Date:	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	1993
Depth (ft bgs):				10-12	16-18
Volatile Organic Compounds					
1,1,1-Trichloroethane	36000	--	640	0.011	0.024
Trichloroethene	6	--	51	--	0.007
Metals					
Aluminum	1100000	--	--	3520	3440
Antimony	470	--	1600	12.9	12.9
Arsenic	3	--	77	2	6.9
Barium	220000	--	--	10.5	10.7
Beryllium	2300	--	7800	0.57	0.46
Chromium (Total) ²	1800000	--	--	7.3	6.8
Cobalt	350	--	--	2.9	3
Lead	800	--	800	4.6	2.8
Manganese	26000	--	--	162	289
Vanadium	5800	--	23000	17.6	14
Zinc	350000	--	1000000	10.9	14.6

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 - BUSTR action level - Class 1 Soil Action Level;
 - Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) Industrial RSL for trivalent chromium applied.

Table A-21a
Screening of Detected Chemicals in Soil - SWMU 122 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			BD-422-SB-01
Sample Date:				2008
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	Comp (Unk)
Volatile Organic Compounds				
1,1,1-Trichloroethane	36000	--	640	0.024
Trichloroethene	6	--	51	0.007
Semivolatile Organic Compounds				
Fluoranthene	30000	--	60000	5.1
Pyrene	23000	--	45000	4.5
Metals				
Arsenic	3	--	77	5.3
Chromium (Total) ²	1800000	--	--	10
Lead	800	--	800	16

Notes:

- Results and action levels are expressed in mg/kg.
 - Analytical results are from samples collected during various geotechnical investigation events.
 - '--' denotes non-detection.
 - 'bgs' - below ground surface.
- Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) Industrial RSL for trivalent chromium applied.

Table A-22
Screening of Detected Chemicals in Soil - SWMU 123
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 123-MW-1S SB	
	Sample Date:	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	1993
Depth (ft bgs):				10-12	12-14
Volatile Organic Compounds					
1,1,1-Trichloroethane	36000	--	640	--	0.49
Acetone	670000	--	110000	0.12	--
Trichloroethylene	6	--	51	--	0.13
Total Petroleum Hydrocarbons					
TPH (Total) ^{2,3}	see note 2	see note 3	--	--	70
Metals					
Aluminum	1100000	--	--	5130	2780
Antimony	470	--	1600	7.2	11.2
Arsenic	3	--	77	5.4	6.4
Barium	220000	--	--	36.4	10.6
Beryllium	2300	--	7800	0.73	0.59
Chromium (Total) ⁴	1800000	--	--	8.1	4.7
Cobalt	350	--	--	4.6	3.1
Copper	47000	--	160000	6	7.5
Lead	800	--	800	4.9	4
Manganese	26000	--	--	428	211
Nickel	22000	--	74000	7.4	6.2
Thallium	7	--	--	--	0.14
Vanadium	5800	--	23000	18.6	13.5
Zinc	350000	--	1000000	21.2	28.5

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).
- '--' denotes non-detection.
- 'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low),
 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀),
 and 5,000 mg/kg for TPH (C₂₀-C₃₄).
- 4) Industrial RSL for trivalent chromium applied.

Table A-22a
Screening of Detected Chemicals in Soil - SWMU 123 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			BD-423-Exc-02 2008	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	Comp (0-6)	12-14
	Volatile Organic Compounds				
Total VOCs	--	--	--	--	--
Polychloronated Biphenyls					
PCBs (Total) ²	1	--	20	--	--
Metals					
Arsenic	3	--	77	9.6	--
Barium	220000	--	--	180	77
Chromium (Total) ³	--	--	--	19	14
Lead	800	--	800	12	9.6

Notes:

- Results and action levels are expressed in mg/kg.

- Analytical results are from samples collected during various geotechnical investigation events.

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) Industrial RSL for PCBs (high risk) applied.

3) Industrial RSL for trivalent chromium applied.

Table A-23
Screening of Detected Chemicals in Soil - SWMU 124
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 124-MW1S SB 1993		AOC K-SS1 1993	AOC K-SB1 1993	
Sample Date:	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	14-16	20-22	0-0.5	4-6	14-16
Volatile Organic Compounds								
1,1,1-Trichloroethane	36000	--	640	--	0.01	--	--	--
Acetone	670000	--	110000	--	--	--	0.07	0.089
Benzene	5	0.149	140	--	--	--	--	0.66
Trichloroethene	6	--	51	0.31	0.02	--	--	--
Total Petroleum Hydrocarbons								
TPH (Total) ^{2,3}	see note 2	see note 3	--	60	140	--	220	--
Metals								
Aluminum	1100000	--	--	2730	3570	na	na	na
Antimony	470	--	1600	11.5	12.6	na	na	na
Arsenic	3	--	77	18.2	3.1	na	na	na
Barium	220000	--	--	8.7	10.2	na	na	na
Beryllium	2300	--	7800	0.45	0.61	na	na	na
Chromium (Total) ⁴	1800000	--	--	7	12.6	na	na	na
Cobalt	350	--	--	2.6	2.8	na	na	na
Copper	47000	--	160000	--	7.1	na	na	na
Cyanide	130	--	1000000	--	0.5	na	na	na
Lead	800	--	800	2.8	4	na	na	na
Manganese	26000	--	--	229	198	na	na	na
Nickel	22000	--	74000	--	6.9	na	na	na
Selenium	5800	--	20000	--	0.21	na	na	na
Thallium	7	--	--	--	0.11	na	na	na
Vanadium	5800	--	23000	13.7	21	na	na	na
Zinc	350000	--	1000000	11.7	21.4	na	na	na

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
BUSTR action level - Class 1 Soil Action Level;
Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).
- 4) Industrial RSL for trivalent chromium applied.

Table A-23a
Screening of Detected Chemicals in Soil - SWMU 124 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			BD-506-Exc-01 2007	BD-506-Exc-02 2006	BD-506PS-Exc-01 1997	N-Fuel-Farm-SB-08 1998
Sample Date:							
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	Comp (0-2.5)	Comp (0-6)	Comp (Unk)	Comp (0-8)
Volatile Organic Compounds							
Ethylbenzene	25	45.5	480	na	na	0.072	--
Xylenes (Total)	2500	15.7	260	na	na	0.098	--
Total Petroleum Hydrocarbons							
TPH (Total) ^{2,3}	see note 2	see note 3	--	na	na	280	na
Polychlorinated Biphenyls							
PCBs (Total) ⁴	1	--	20	--	--	na	na
Metals							
Arsenic	3	--	77	5.8	na	na	na
Barium	220000	--	--	57	na	na	na
Chromium (Total) ⁵	1800000	--	--	16	na	na	na
Lead	800	--	800	44	na	na	na

Notes:

- Results and action levels are expressed in mg/kg.

- Analytical results are from samples collected during various geotechnical investigation events.

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

4) Industrial RSL for PCBs (high risk) applied.

5) Industrial RSL for trivalent chromium applied.

Table A-24
Screening of Detected Chemicals in Soil - SWMU 141
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SD 26-SB1 1993			
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	0-0.5	6-8	26-28	28-30
Volatile Organic Compounds							
1,1,1-Trichloroethane	36000	--	640	--	--	0.047	0.031
Acetone	670000	--	110000	0.019	--	--	--
cis-1,2-Dichloroethene	2300	--	--	--	--	0.063	0.052
Trichloroethene	6	--	51	--	--	0.8	0.69
Total Petroleum Hydrocarbons							
TPH (Total) ^{2,3}	see note 2	see note 3	--	11796	--	--	--

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-25
Screening of Detected Chemicals in Soil - SWMU 142
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 142-SS1 1992	SWMU 142-SS2 1992	SWMU 142-SS3 1992
Sample Date:	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	0-0.5	0-0.5	0-0.5
Volatile Organic Compounds						
1,1,1-Trichloroethane	36000	--	640	0.098	0.14	0.13
Methylene Chloride	1000	--	3300	--	0.009	0.007
Tetrachloroethene	100	--	170	0.062	0.1	0.014
Total Petroleum Hydrocarbons						
TPH (Total) ^{2,3}	see note 2	see note 3	--	8000	23000	5000
Metals						
Aluminum	1100000	--	--	13900	9090	6410
Antimony	470	--	1600	0.22	0.55	0.22
Arsenic	3	--	77	5.4	6.5	4.3
Barium	220000	--	--	103	61.7	43.5
Beryllium	2300	--	7800	0.61	0.47	0.34
Chromium (Total) ⁴	1800000	--	--	17.4	14.2	9.6
Cobalt	350	--	--	9.3	87.4	18.3
Copper	47000	--	160000	13.3	22.4	9.7
Lead	800	--	800	12.9	10.9	8.3
Manganese	26000	--	--	601	466	261
Nickel	22000	--	74000	20.4	21.8	10.9
Thallium	7	--	--	--	--	0.16
Vanadium	5800	--	23000	30.8	20.1	15.2
Zinc	350000	--	1000000	50.2	37.5	30

Notes:

- Results and action levels are expressed in mg/kg.

- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

4) Industrial RSL for trivalent chromium applied.

Table A-26
Screening of Detected Chemicals in Soil - AOC A
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SS 27-SB1 1993		SS 27-SB2 1993		
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	0-2	2-4	0-2	2-4	8-10
Volatile Organic Compounds								
1,1,1-Trichloroethane	36000	--	1300	0.007	0.064	--	--	--
Tetrachloroethene	100	--	170	0.035	0.017	--	--	--
Toluene	47000	49.1	520	0.035	0.013	--	--	--
Trichloroethylene	6	--	150	0.035	0.053	--	--	--
Xylenes (Total)	2500	15.7	370	0.013	--	--	--	--
Total Petroleum Hydrocarbons								
TPH (Total) ^{2,3}	see note 2	see note 3	--	83	55	77	--	--

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-27
Screening of Detected Chemicals in Soil - AOCs D and I
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SS-29-SB-01 1991		SS-29-SB-02 1991		ST-32-SB-01 1993		ST-33-SB-01 1993	
Sample Date:	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	18-20	20-22	18-20	20-22	0-2	2-4	0-2	8-10
Total Petroleum Hydrocarbons											
TPH (Total) ^{2,3}	see note 2	see note 3	--	1066	1359	53	2247	1,735	659	4,327	530

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-27a
Screening of Detected Chemicals in Soil - AOCs D and I Engineering Data
GE Aviation - Evendale, Ohio

Sample ID: Sample Date:	Screening Value/Action Level ¹			BV3-DP02 2000		BV3-DP03 2000		BV3-DP04 2000		BV3-DP07 2000	BV3-DP08 2000
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	14-16	21-22	10-12	18-20	2-4	16-18	18-20	15-16
Semivolatile Organic Compounds											
Benzo(a)anthracene	2.9	11	58	--	--	1.03	--	2.26	--	--	--
Benzo[a]pyrene	0.29	1.1	5.8	--	--	--	--	1.97	--	--	--
Benzo[b]fluoranthene	2.9	11	58	--	--	--	--	2.42	--	--	--
Benzo[k]fluoranthene	29	110	580	--	--	--	--	0.94	--	--	--
Chrysene	290	1100	5800	--	--	1.11	--	2.38	--	--	--
Dibenz[a,h]anthracene	0.29	1.1	5.8	--	--	--	--	0.42	--	--	--
Indeno[1,2,3-cd]pyrene	2.9	--	58	--	--	0.54	--	1.21	--	--	--
Naphthalene	17	39.8	450	--	0.48	1.08	--	0.18	--	--	--
Total Petroleum Hydrocarbons											
TPH (Total) ^{2,3}	see note 2	see note 3	--	--	--	--	--	--	--	--	--
TPH GRO (C ₆ -C ₁₂) ^{2,3}	see note 2	see note 3	--	--	88.46	--	180	12.47	--	479	--
TPH DRO (C ₁₀ -C ₂₈) ^{2,3}	see note 2	see note 3	--	11.6	1353	2061	357	521	--	3473	6.4

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from samples collected during various geotechnical investigation events.

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-28
Screening of Detected Chemicals in Soil - AOC L
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			AOC L-SB1 1992		AOC L-SS1 1992	AOC L-MW1S-SB 1992	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	6-8	8-10	0-0.5	8-10	12-14
Semivolatile Organic Compounds								
2-Methylnaphthalene	3000	--	6000	--	--	--	6.7	8.3
Naphthalene	17	39.8	450	--	--	--	4.7	3.4
Total Petroleum Hydrocarbons								
TPH (Total) ^{2,3}	see note 2	see note 3	--	3700	2700	--	na	na

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
- 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
- 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-29
Screening of Detected Chemicals in Soil - AOC W2 and SWMUs 62 and 63
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 62/63 SB1		SWMU 62/63-MW2S SB		SWMU 62/63-MW3S SB		SWMU 62/63-MW4S SB	
Sample Date:				1993		1993		1993		1993	
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	0-2	2-4	4-6	20-22	4-6	6-8	4-6	12-14
Volatile Organic Compounds											
1,1,1-Trichloroethane	36000	--	640	--	--	--	0.027	--	--	--	--
2-Butanone	190000	--	28000	--	0.038	0.02	--	--	--	2.7	1.7
Acetone	670000	--	110000	--	0.34	--	--	--	--	--	--
Ethylbenzene	25	45.5	480	--	--	--	--	0.1	--	--	--
Trichloroethene	6	--	51	--	--	--	0.1	--	--	--	--
Xylenes (Total)	2500	15.7	260	--	--	--	--	0.28	--	--	--
Total Petroleum Hydrocarbons											
TPH (Total) ^{2,3}	see note 2	see note 3	--	--	--	--	--	290	--	250	85

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-30
Screening of Detected Chemicals in Soil - AOC W3 and SWMUs 64 and 68
GE Aviation - Evendale, Ohio

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU 64/68-SB1 (MW-1S) 1992		SWMU 64/68-SB2 1992		SWMU Tank 505-SB1 1994		SWMU Tank 505-SB2 1994		SWMU Tank 505-SB3 1994		SWMU Tank 505-SB4 1994	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	0-2	16-18	2-4	14-16	16-18	18-20	10-12	14-16	14-16	18-20	12-14	16-18
	Volatile Organic Compounds														
2-Butanone	190000	--	28000	--	--	--	--	--	na	2.1	1.7	--	na	na	--
Acetone	670000	--	110000	0.18	--	--	--	--	na	--	--	--	na	na	--
Ethylbenzene	25	45.5	480	--	--	--	--	0.056	na	--	--	--	na	na	--
Methylene Chloride	1000	--	3300	--	--	--	--	--	na	--	--	--	na	na	--
Xylenes (Total)	2500	15.7	260	--	--	--	--	--	na	--	--	--	na	na	--
Total Petroleum Hydrocarbons															--
TPH (Total) ^{2,3}	see note 2	see note 3	--	140	170	--	--	110	100	71	370	--	140	98	--

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU Tank 505-SB5 1994		SWMU Tank 505-SB6 1994		SWMU Tank 505-SB7 1994		SWMU Tank 505-SB8 1994		SWMU Tank 505-SB9 1994		SWMU Tank 505-SB10 1994	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	12-14	16-18	10-12	14-16	2-4	4-6	0-2	18-20	8-10	14-16	2-4	12-14
	Volatile Organic Compounds														
2-Butanone	190000	--	28000	--	na	--	na	--	1.8	--	0.062	--	--	--	--
Acetone	670000	--	110000	--	na	--	na	--	--	--	--	--	--	--	--
Ethylbenzene	25	45.5	480	--	na	--	na	--	--	--	--	--	--	--	--
Methylene Chloride	1000	--	3300	--	na	--	na	--	--	--	--	--	--	--	--
Xylenes (Total)	2500	15.7	260	--	na	--	na	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons															--
TPH (Total) ^{2,3}	see note 2	see note 3	--	740	350	760	1000	--	--	63	--	120	--	210	--

Sample ID: Sample Date: Depth (ft bgs):	Screening Value/Action Level ¹			SWMU Tank 505-SB11 1994		SWMU Tank 505-SB12 1994		SWMU Tank 505-SB13 1994		SWMU Tank 505-SB14 1994		SWMU Tank 505-SB15 1994		
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	12-14	16-18	6-8	18-20	16-18	18-20	16-18	18-20	16-18	18-20	
	Volatile Organic Compounds													
2-Butanone	190000	--	28000	--	na	na	--	--	na	--	na	na	--	
Acetone	670000	--	110000	--	na	na	--	--	na	--	na	na	--	
Ethylbenzene	25	45.5	480	--	na	na	--	--	na	2.8	na	na	--	
Methylene Chloride	1000	--	3300	--	na	na	--	--	na	--	na	na	--	
Xylenes (Total)	2500	15.7	260	--	na	na	--	5.8	na	3.5	na	na	--	
Total Petroleum Hydrocarbons														--
TPH (Total) ^{2,3}	see note 2	see note 3	--	--	9100	110	380	--	1500	250	1900	110	820	--

Notes:

- Results and action levels are expressed in mg/kg.
 - Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).
 - '--' denotes non-detection.
 - 'bgs' - below ground surface.
 - 'na' - not analyzed for this constituent.
- Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.
- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
BUSTR action level - Class 1 Soil Action Level;
Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.
 - 2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).
 - 3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-30a
Screening of Detected Chemicals in Soil - AOC W3 and SWMUs 64 and 68 Engineering Data
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			N-Fuel-Farm-Exc-10 1998	N-Fuel-Farm-Exc-11 2006	N-Fuel-Farm-SB-06 1998	N-Fuel-Farm-SB-07 1998
Sample Date:							
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	Comp (Unk)	Comp (0-5)	16-18	Comp (0-8)
Volatile Organic Compounds							
Total VOCs	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons							
TPH (Total) ^{2,3}	see note 2	see note 3	--	130	--	na	na
Metals							
Arsenic	3	--	77	--	6.1	na	na
Barium	220000	--	--	56	39	na	na
Chromium (Total) ⁴	1800000	--	--	20	7.1	na	na
Lead	800	--	800	--	7.5	na	na

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from samples collected during various geotechnical investigation events.

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

4) Industrial RSL for trivalent chromium applied.

Table A-31
Screening of Detected Chemicals in Soil - AOC W4 and SWMU 65
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			SWMU 65-SB1		SWMU 65-SB2		AOC W4-SB1		AOC W4-SB2		UST507-SB1		UST507-SB2	
Sample Date:				1992		1992		1992		1992		1992		1992	
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	14-16	16-18	10-12	14-16	14-16	16-18	14-16	18-20	0-2	10-12	10-12	20-22
Volatile Organic Compounds															
2-Butanone	190000	--	28000	--	--	--	--	--	--	--	--	0.014	--	--	--
Acetone	670000	--	110000	0.17	0.12	0.092	0.093	--	--	0.027	--	--	--	--	--
Benzene	5.1	0.149	140	--	--	--	--	--	--	0.008	--	--	--	--	--
Toluene	47000	49.1	820	--	--	0.005	0.015	--	--	0.019	--	--	--	--	--
Total Petroleum Hydrocarbons															
TPH (Total) ^{2,3}	see note 2	see note 3	--	--	--	--	--	130	na	2400	6500	--	--	--	--

Sample ID:	Screening Value/Action Level ¹			UST507-SB3		UST507-SB4		UST507-SB5		UST507-SB6		UST507-SB7		UST507-SB8	
Sample Date:				1994		1994		1994		1994		1994		1994	
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	14-16	16-18	14-16	18-20	14-16	20-22	8-10	20-22	2-4	14-16	8-10	12-14
Volatile Organic Compounds															
2-Butanone	190000	--	28000	--	--	na	--	--	--	na	na	--	--	--	na
Acetone	670000	--	110000	--	--	na	--	--	--	na	na	0.012	0.015	--	na
Benzene	5.1	0.149	140	--	--	na	--	--	--	na	na	--	--	--	na
Toluene	47000	49.1	820	--	--	na	--	--	--	na	na	--	--	--	na
Total Petroleum Hydrocarbons															
TPH (Total) ^{2,3}	see note 2	see note 3	--	6400	1200	1200	2600	8000	900	--	71	--	--	--	--

Notes:

- Results and action levels are expressed in mg/kg.

- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

'na' - not analyzed for this constituent.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-32
Screening of Detected Chemicals in Soil - AOC W10, SWMU 72
GE Aviation - Evendale, Ohio

Sample ID:	Screening Value/Action Level ¹			ST-14 1993				ST-15 1993			ST-16 1993		ST-17 1993		ST-18 1993	
Sample Date:	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	0-2	14-16	16-18	20-22	1-3	12-14	14-16	10-12	12-14	10-12	12-14	10-12	12-14
Volatile Organic Compounds																
Acetone	670000	--	110000	--	--	--	--	--	--	--	--	--	--	--	0.089	--
Total Petroleum Hydrocarbons																
TPH (Total) ^{2,3}	see note 2	see note 3	--	--	1531	1448	8029	57	21	738	68	2750	306	371	136	4887

Notes:

- Results and action levels are expressed in mg/kg.

- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs for TPH ranges are: 420 mg/kg for TPH (Aromatic Low), 440 mg/kg for TPH (Aliphatic Medium), and 33,000 mg/kg for TPH (Aromatic High).

3) The BUSTR action levels for TPH ranges are: 1,000 mg/kg for TPH (C₆-C₁₂), 2,000 mg/kg for TPH (C₁₀-C₂₀), and 5,000 mg/kg for TPH (C₂₀-C₃₄).

Table A-33
Screening of Detected Chemicals in Soil - AOC LD
GE Aviation - Evendale, Ohio

Sample ID: Sample Date:	Screening Value/Action Level ¹			AOC LD-SB1 1994			AOC LD-SB2 1994			AOC LD-SB3 1994			AOC LD-SB4 1994	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	2-4	10-12	12-14	12-14	14-16	6-8	16-18	10-12	14-16		
Volatile Organic Compounds														
1,1,1-Trichloroethane	36000	--	640	--	4.6	7.6	--	--	0.023	0.031	2.3	0.046		
1,2-Dichloroethene (Total) ²	2300	--	--	--	--	--	--	--	--	--	--	--		
Acetone	670000	--	110000	0.015	--	--	--	--	0.019	0.037	--	--		
Tetrachloroethene	10	--	170	--	--	--	--	--	--	--	--	--		
Trichloroethene	6	--	51	--	2.8	4.3	9.2	4.2	0.028	0.095	1.7	0.19		

Sample ID: Sample Date:	Screening Value/Action Level ¹			AOC LD-SB5 1994		AOC LD-SB6 1994		AOC LD-MW-2S 1994		AOC LD-MW-3S 1994	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	14-16	16-18	14-16	16-18	16-18	12-14	16-18	
Volatile Organic Compounds											
1,1,1-Trichloroethane	36000	--	640	0.042	0.69	0.079	0.047	6.1	0.006	0.22	
1,2-Dichloroethene (Total) ²	2300	--	--	--	--	0.046	--	--	--	--	
Acetone	670000	--	110000	0.017	--	--	--	--	--	--	
Tetrachloroethene	10	--	170	--	--	--	--	--	0.006	--	
Trichloroethene	6	--	51	0.12	0.78	0.79	0.46	9.6	0.009	0.073	

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

2) The USEPA Industrial RSLs do not have a screening value for total 1,2-Dichloroethene, therefore the screening level for cis-1,2-Dichloroethene has been substituted.

Table A-34
Screening of Detected Chemicals in Soil - AOC PST
GE Aviation - Evendale, Ohio

Sample ID: Sample Date:	Screening Value/Action Level ¹			AOC PST-SB1 1992		AOC PST-SB2 1992		AOC PST-SB3 1992		AOC PST-SB4 1992		AOC PST-SB5 1992	
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	8-10	12-14	10-12	14-16	12-14	14-16	10-12	14-16	12-14	14-16
Volatile Organic Compounds													
1,1,1-Trichloroethane	36000	--	640	12	9.7	44	61	16	13	1.9	1.1	1.3	1.4
Methylene Chloride	1000	--	3,300	--	--	--	--	--	--	--	--	--	--
Trichloroethene	6	--	51	6.6	6.2	14	25	6.8	6.4	0.95	--	0.7	0.76
Sample ID: Sample Date:	Screening Value/Action Level ¹			AOC PST-SB6 1992		AOC PST-SB7 1992		AOC PST-SB8 1992		AOC PST-SB9 1992			
	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	12-14	14-16	4-6	12-14	10-12	12-14	8-10	10-12		
Volatile Organic Compounds													
1,1,1-Trichloroethane	36000	--	640	20	14	2	6.1	9.6	3	12	12		
Methylene Chloride	1000	--	3,300	--	--	--	--	--	--	--	15		
Trichloroethene	6	--	51	13	10	1.4	3.9	5.5	1.8	7.8	8		

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from the RCRA Facility Investigation Revised Draft Report (O'Brien & Gere 1995).

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);

BUSTR action level - Class 1 Soil Action Level;

Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.

Table A-34a
Screening of Detected Chemicals in Soil - AOC PST Engineering Data
GE Aviation - Evendale, Ohio

Sample ID:				BD-500-Exc-06	BD-700-Exc-25	BD-700-SS-07
Sample Date:	Screening Value/Action Level ¹			2013	2000	2001
Depth (ft bgs):	USEPA Industrial Soil RSLs	BUSTR	Ohio VAP	Comp (Unk)	Comp (0-4)	Comp (surf.)
Volatile Organic Compounds						
1,1,1-Trichloroethane	36000	--	640	--	0.028	--

Notes:

- Results and action levels are expressed in mg/kg.
- Analytical results are from samples collected during various geotechnical investigation events.

'--' denotes non-detection.

'bgs' - below ground surface.

Shaded cells indicate concentrations above the January 2015 USEPA Industrial Soil Screening Level.

- 1) USEPA Regional Screening Level (RSL) - Industrial (USEPA, January 2015);
 BUSTR action level - Class 1 Soil Action Level;
 Ohio VAP action level - Commercial/Industrial Generic Direct Contact Soil Standard.



Appendix B

Risk-Based Soil Cleanup Goals for Facility COPCs

EXPOSURE PARAMETER ESTIMATES

Values selected for the exposure parameters used to support the development of risk-based soil cleanup goals are presented in Tables B-7 through B-12, and are discussed below. The majority of values selected for this evaluation are derived from USEPA risk assessment guidance. It should be noted that several of the exposure parameter values used in this evaluation are also incorporated into the most recent update of the USEPA's *Standard Default Exposure Factors* (USEPA 2014b).

Dermal Absorption Factor

The dermal absorption factor (ABS, unitless) represents the fraction of the soil chemical that may be absorbed through the skin during each exposure event. In general, metals are poorly absorbed through the skin; organic chemicals may be absorbed more readily. Chemical-specific values were obtained from the USEPA's *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)* (*RAGS Part E*, USEPA 2004, Exhibit 3-4). Table 2 of that document presents the available chemical-specific values used in the HHRA.

Soil-to-Skin Adherence Factor

The soil to skin adherence factor (AF, mg/cm²) represents the average mass of soil that adheres to the skin over each exposure event. The AF depends on the specific activity being conducted and is higher for body parts with greater exposure to the media. AFs are therefore derived as the body part-weighted average estimates for each potential receptor, considering the specific activities in which each potential receptor group is likely to participate. The specific AFs were obtained from USEPA's *RAGS Part E* (USEPA 2004, Exhibit 3-3) and *Standard Default Exposure Factors* (USEPA 2014b). The AF values selected for each potential receptor is summarized below.

- For an outdoor industrial worker, the AF value is 0.12 mg/cm², the USEPA recommended value for outdoor workers (USEPA 2014b).
- For a utility worker, the AF value is 0.2 mg/cm², the geometric mean weighted soil AF for utility workers (USEPA 2004).
- For a construction worker, the AF value is 0.3 mg/cm². This value is based on the 95th percentile weighted soil AF for construction workers (USEPA 2004).
- For older child and adult trespassers, the AF value is 0.07 mg/cm. This value is the recommended soil adherence value for adult residents (USEPA 2014b).

Averaging Time

The averaging time (AT, days) is the time period over which exposure is averaged. In accordance with *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Part A* (*RAGS Part A*, USEPA 1989, Exhibits 6-11 through 6-19), the averaging time for exposure to potential carcinogenic compounds (AT-C) is 25,550 days. This accounts for exposure to a carcinogenic substance over a 70-year lifetime. For exposure to non-carcinogens, the averaging time (AT-NC) is calculated as the exposure duration (years) multiplied by 365 days per year (USEPA 1989, Exhibits 6-11 through 6-19). Therefore, the averaging time for exposure to non-carcinogenic substances varies by potential receptor and depends on exposure duration.

Body Weight

The body weight (BW, kg) estimates are receptor-specific for adults and older children. A default adult body weight of 80 kg (USEPA 2014b) was applied for all potential adult receptors (industrial workers, utility worker, construction worker, adult trespasser). For older children (12 - <18 years), a body weight of 56.8 kg was used. This value is based on mean values for yearly age groups reported by USEPA in its *Exposure Factors Handbook: 2011 Edition* (USEPA 2011, Table 8-1 [adults and older children]).

Exposure Duration

The exposure duration (ED) is an estimate of the time period over which a potential receptor is exposed and is typically expressed in years. Because the duration of exposure can vary greatly for construction workers, utility workers, and trespassers, there are no recommended ED values for these groups of potential receptors. Therefore, the selection of ED values was based on best professional judgment. The ED values for each potential receptor are discussed below.

- For outdoor and indoor industrial workers, an ED of 25 years was applied. This exposure duration is consistent with the USEPA recommended values for industrial workers (USEPA 2014b).
- The ED value for the utility worker is based on the USEPA recommended value for industrial workers (USEPA 2014b), as discussed above.
- For the construction worker, an ED of 1 year was applied. This value is based on professional judgment, assuming that 1 year is a conservative estimate of the duration of a representative construction project at the Facility.
- For the older child trespasser, an ED value of 6 years was applied. For the adult trespasser, an ED value of 25 years is assumed.

Exposure Frequency

Exposure frequency (EF, in days/year) is a receptor-specific estimate of how frequently exposure occurs. The EF values described below are based on best professional judgment for the majority of the potential receptor groups.

- For the outdoor industrial worker, an EF of 225 days/year was applied, consistent with the USEPA recommended value for outdoor workers (USEPA 2014b).
- For the indoor industrial worker, an EF of 250 days/year was applied. This value is consistent with USEPA's recommended ED value indoor workers (USEPA 2014b).
- An EF of 24 days/year was assumed for the utility worker to address the periodic servicing, repair, and maintenance of underground utilities at the Facility.
- An EF of 120 days/year is assumed for the construction worker. This EF assumes that a construction project will require 24 weeks of a construction worker's time (working five days per week) over the course of a given year.
- The EF for trespassers (older child and adult) is 78 days/year, and assumes that a trespasser will visit the Facility two times per week during the nine warmer months of the year.

Exposure Time

The exposure time (ET, in hours/day) is a receptor-specific parameter that applies to inhalation exposure and describes the length of time over which potential exposure occurs. ET values used in this HHRA for each exposure scenario were developed based on best professional judgment, and correspond to typical or estimated daily time periods spent by these potential receptors at jobsites.

- The ET value selected for the industrial workers, utility worker, and construction worker is 8 hours/day. This value is consistent with USEPA's supplemental guidance for inhalation risk assessment, which generally defines a typical workday for construction and commercial-industrial workers as 8 hours (USEPA 2009; 2014b).
- For persons trespassing at the Facility, an ET of 4 hours/day was selected based on best professional judgment.

Soil Ingestion Rate

The soil ingestion rate (IR, in mg/day) refers to the rate at which bulk soil or soil dust is incidentally ingested. The IR values were obtained from USEPA's *Update of Standard Default Exposure Factors* (USEPA 2014b). Soil ingestion rates used in the HHRA are described below.

- For the outdoor industrial worker and utility workers, the IR value is 100 mg/day. This value is consistent with the USEPA recommended value for outdoor workers (USEPA 2014b).
- For the indoor industrial worker, the IR value is 50 mg/day, and corresponds to the recommended value for indoor workers in USEPA's *Update of Standard Default Exposure Factors* (USEPA 2014b).
- The IR value applied for the construction worker is 330 mg/day, and is consistent with the USEPA recommended high-end soil ingestion value for construction workers (USEPA 2014b).
- The IR value for the older child and adult trespasser is 100 mg/day, and is based on USEPA recommended soil ingestion rate for adult residents (USEPA 2014b).

Skin Surface Area Estimates

Skin surface area (SA) for dermal absorption (cm^2) represents the exposed surface area of the skin that may contact soil, and is highly dependent on the age of the potential receptor and the nature of activity or work they are conducting. The SA values used in the development of risk-based soil cleanup goals at the Facility are as follows:

- The SA values for the outdoor industrial worker, utility worker, and construction worker are identical ($3,470 \text{ cm}^2$), and consistent with USEPA recommended skin surface area value for outdoor workers (USEPA 2014b).
- For the adolescent trespasser, the SA value for surface soil exposure is $4,849 \text{ cm}^2$ based on the 50th percentile average male and female adult surface areas for the face, forearms, hands, and lower legs (USEPA 2004, Exhibit C-1).
- The adult trespasser SA value is $6,032 \text{ cm}^2$, and is consistent with USEPA's recommended skin surface area value for adult residents (USEPA 2014b).

AIR EMISSION RATES

Inhalation of soil dust and ambient vapors are viable potential exposure routes at the Facility that must be accounted in the derivation of risk-based soil cleanup goals. Of the soil chemicals retained as COPCs, non-volatile chemicals that partition to airborne particulates (i.e., soil dust) are evaluated as particulate emissions. Volatile chemicals that partition to the ambient air in gaseous form are evaluated as vapor phase emissions.

The particulate emission factor (PEF) is a site-specific parameter that describes the emission flux of soil particulates (i.e., soil dust) in ambient air. Derivation of the PEF incorporates site-specific meteorological information, site size, and the fraction of vegetative cover. Volatilization of organic chemicals from affected soil to the atmosphere and subsequent inhalation also represents a potentially complete pathway for human exposure at the Facility. The relationship between the concentration of a volatile chemical in soil and the flux of the chemical to the air is explained by the volatilization factor (VF). The values for VF are specific to each COPC of sufficiently volatile behavior in soil. PEFs and VFs for evaluating the ambient inhalation pathway were calculated based on methodologies presented in USEPA's *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA 2002). Derivation of the PEF and VF terms are presented in Tables B-13 through B-16.

Particulate Emission Factor

The equation used to derive the PEF for dust inhalation is as follows:

$$\text{PEF}(\text{m}^3/\text{kg}) = Q/C \times \frac{3600}{0.036 \times (1 \times V) \times (U_m/U_t)^3 \times F(x)}$$

where:

Q/C = Dispersion factor for wind erosion ($\text{g}/\text{m}^2\text{-s}$ per kg/m^3);

V = Fraction of vegetative cover (unitless);

U_m = Mean annual wind speed (m/s);

U_t = Equivalent threshold value of wind speed at 7 m (m/s); and

$F(x)$ = Function dependent on U_m/U_t (unitless).

The PEF for the Facility was derived using Equation 4-5 of USEPA (2002), as presented above. Site-specific values for mean annual wind speed (U_m) and fraction of vegetative cover (V) were used to derive the PEFs (Table B-13). An average wind speed (4.02 m/s) was applied based on average annual wind speed data for the Cincinnati area (Current Results 2015). In addition, a V value of 0.2 (20%) was applied for the Facility, based on the estimated proportion of vegetative cover. Default parameter values provided in USEPA (2002) were utilized for the equivalent threshold value of wind speed at 7 meters (U_t ; 11.32 m/s), and $F(x)$ (0.194).

Volatilization Factor

The equation used to derive VFs for volatile COPCs is as follows:

$$VF(m^3 / kg) = Q/C \times \frac{(3.14 \times D_A \times T)^{1/2}}{(2 \times \rho_b \times D_A)} \times 10^{-4} (m^2 / cm^2)$$

where:

Q/C = Dispersion factor for volatilization (g/m²-s per kg/m³);

D_A = Apparent diffusivity (cm²/s);

T = Exposure interval (s); and

ρ_b = Dry soil bulk density (g/cm³).

The Q/C term is an air dispersion factor and is derived from air dispersion constants (A, B, and C) for each of 29 specific climate zones selected to be representative of the range of meteorological conditions across the country, as defined by USEPA (2002) (Table B-14). The D_A term is chemical-specific, and is calculated using default values for soil bulk density (ρ_b), soil particle density, water-filled soil porosity, and soil organic carbon content. Chemical-specific values for diffusivity in water, diffusivity in air, soil organic carbon partition coefficient, and Henry's Law constant are also applied to develop the value for D_A (Table B-15). The T term describes the interval of potential exposure, and is a default value for non-residential exposures from USEPA (2002).

TABLE B-1
DERIVATION OF SOIL CLEANUP GOALS - OUTDOOR INDUSTRIAL WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway				Soil Cleanup Goal Equation						
Soil Ingestion RG (non-carcinogenic) =				$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times (1/\text{RfDo}) \times \text{IR} \times \text{CF1}}$						
Soil Ingestion RG (carcinogenic) =				$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{CSFo} \times \text{IR} \times \text{CF1}}$						
Soil Dermal RG (non-carcinogenic) =				$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times 1/(\text{RfDo} \times \text{GIABS}) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$						
Soil Dermal RG (carcinogenic) =				$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times (\text{CSFo}/\text{GIABS}) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$						
Soil Inhalation RG (non-carcinogenic) =				$\frac{\text{THQ} \times \text{ATn}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times (1/\text{RfC}) \times (1/\text{VF} + 1/\text{PEF})}$						
Soil Inhalation RG (carcinogenic) =				$\frac{\text{TR} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times \text{IUR} \times (1/\text{VF} + 1/\text{PEF})}$						
Constituent of Potential Concern	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Oral Reference Dose (adjusted for gastrointestinal absorption) mg/kg-day	Oral Cancer Slope Factor (adjusted for gastrointestinal absorption) (mg/kg-day) ⁻¹	Dermal RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Unit Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
INORGANICS										
Arsenic (non-carcinogenic)	3.00E-04	--	3.89E+02	3.00E-04	--	3.12E+03	1.50E-05	--	3.29E+04	3.42E+02
Arsenic (carcinogenic)	--	1.50E+00	2.42E+01	--	1.50E+00	1.94E+02	--	4.30E+00	1.43E+04	2.15E+01
Cyanide (non-carcinogenic)	6.00E-04	--	7.79E+02	6.00E-04	--	NC	8.00E-04	--	1.75E+06	7.78E+02
Cyanide (carcinogenic)	--	--	--	--	--	--	--	--	--	--
Nickel (non-carcinogenic)	2.00E-02	--	2.60E+04	8.00E-04	--	NC	9.00E-05	--	1.97E+05	2.29E+04
Nickel (carcinogenic)	--	--	--	--	--	--	--	2.60E-01	2.36E+05	2.36E+05
POLYCYCLIC AROMATIC HYDROCARBONS										
Benzo(a)pyrene (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene (carcinogenic)	--	7.30E+00	4.98E+00	--	7.30E+00	9.20E+00	--	1.10E+00	5.57E+04	3.23E+00
Benzo(b)fluoranthene (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene (carcinogenic)	--	7.30E-01	4.98E+01	--	7.30E-01	9.20E+01	--	1.10E-01	5.57E+05	3.23E+01
TOTAL PETROLEUM HYDROCARBONS										
Total Petroleum Hydrocarbons (non-carcinogenic)	4.00E-03	--	5.19E+03	4.00E-03	--	NC	3.00E-03	--	6.57E+06	5.19E+03
Total Petroleum Hydrocarbons (carcinogenic)	--	--	--	--	--	--	--	--	--	--

TABLE B-1
DERIVATION OF SOIL CLEANUP GOALS - OUTDOOR INDUSTRIAL WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway				Soil Cleanup Goal Equation						
Soil Ingestion RG (non-carcinogenic) =				$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times (1/\text{RfDo}) \times \text{IR} \times \text{CF1}}$						
Soil Ingestion RG (carcinogenic) =				$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{CSFo} \times \text{IR} \times \text{CF1}}$						
Soil Dermal RG (non-carcinogenic) =				$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times 1/(\text{RfDo} \times \text{GIABS}) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$						
Soil Dermal RG (carcinogenic) =				$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times (\text{CSFo}/\text{GIABS}) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$						
Soil Inhalation RG (non-carcinogenic) =				$\frac{\text{THQ} \times \text{ATn}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times (1/\text{RfC}) \times (1/\text{VF} + 1/\text{PEF})}$						
Soil Inhalation RG (carcinogenic) =				$\frac{\text{TR} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times \text{IUR} \times (1/\text{VF} + 1/\text{PEF})}$						
Constituent of Potential Concern	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Oral Reference Dose (adjusted for gastrointestinal absorption) mg/kg-day	Oral Cancer Slope Factor (adjusted for gastrointestinal absorption) (mg/kg-day) ⁻¹	Dermal RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Unit Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
POLYCHLORINATED BIPHENYLS										
PCBs - high risk (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
PCBs - high risk (carcinogenic)	--	2.00E+00	1.82E+01	--	2.00E+00	3.12E+01	--	5.70E-01	1.08E+05	1.15E+01
VOLATILE ORGANIC COMPOUNDS										
Trichloroethene (non-carcinogenic)	5.00E-04	--	6.49E+02	5.00E-04	--	NC	2.00E-03	--	1.04E+02	8.97E+01
Trichloroethene (carcinogenic)	--	4.60E-02	7.90E+02	--	4.60E-02	NC	--	4.10E-03	3.55E+02	2.45E+02

Notes:

Cells highlighted in blue are the lowest calculated soil remediation goal for that constituent.

NC - Not calculable. Dermal absorption factor not available.

RG - Soil cleanup goal

TABLE B-2
DERIVATION OF SOIL CLEANUP GOALS - INDOOR INDUSTRIAL WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway		Soil Cleanup Goal Equation					
Soil Ingestion RG (non-carcinogenic) =		$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times (1/\text{RfDo}) \times \text{IR} \times \text{CF1}}$					
Soil Ingestion RG (carcinogenic) =		$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{CSFo} \times \text{IR} \times \text{CF1}}$					
Soil Inhalation RG (non-carcinogenic) =		$\frac{\text{THQ} \times \text{ATn}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times (1/\text{RfC}) \times (1/\text{VF} + 1/\text{PEF})}$					
Soil Inhalation RG (carcinogenic) =		$\frac{\text{TR} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times \text{IUR} \times (1/\text{VF} + 1/\text{PEF})}$					
Constituent of Potential Concern	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Unit Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
INORGANICS							
Arsenic (non-carcinogenic)	3.00E-04	--	7.01E+02	1.50E-05	--	2.96E+04	6.85E+02
Arsenic (carcinogenic)	--	1.50E+00	4.36E+01	--	4.30E+00	1.28E+04	4.35E+01
Cyanide (non-carcinogenic)	6.00E-04	--	1.40E+03	8.00E-04	--	1.58E+06	1.40E+03
Cyanide (carcinogenic)	--	--	--	--	--	--	--
Nickel (non-carcinogenic)	2.00E-02	--	4.67E+04	9.00E-05	--	1.77E+05	3.70E+04
Nickel (carcinogenic)	--	--	--	--	2.60E-01	2.12E+05	2.12E+05
POLYCYCLIC AROMATIC HYDROCARBONS							
Benzo(a)pyrene (non-carcinogenic)	--	--	--	--	--	--	--
Benzo(a)pyrene (carcinogenic)	--	7.30E+00	8.96E+00	--	1.10E+00	5.02E+04	8.96E+00
Benzo(b)fluoranthene (non-carcinogenic)	--	--	--	--	--	--	--
Benzo(b)fluoranthene (carcinogenic)	--	7.30E-01	8.96E+01	--	1.10E-01	5.02E+05	8.96E+01
TOTAL PETROLEUM HYDROCARBONS							
Total Petroleum Hydrocarbons (non-carcinogenic)	4.00E-03	--	9.34E+03	3.00E-03	--	5.91E+06	9.33E+03
Total Petroleum Hydrocarbons (carcinogenic)	--	--	--	--	--	--	--
POLYCHLORINATED BIPHENYLS							
PCBs - high risk (non-carcinogenic)	--	--	--	--	--	--	--
PCBs - high risk (carcinogenic)	--	2.00E+00	3.27E+01	--	5.70E-01	9.68E+04	3.27E+01
VOLATILE ORGANIC COMPOUNDS							
Trichloroethene (non-carcinogenic)	5.00E-04	--	1.17E+03	2.00E-03	--	9.37E+01	8.67E+01

TABLE B-2
DERIVATION OF SOIL CLEANUP GOALS - INDOOR INDUSTRIAL WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway	Soil Cleanup Goal Equation						
Soil Ingestion RG (non-carcinogenic) =	$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times (1/\text{RfDo}) \times \text{IR} \times \text{CF1}}$						
Soil Ingestion RG (carcinogenic) =	$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{CSFo} \times \text{IR} \times \text{CF1}}$						
Soil Inhalation RG (non-carcinogenic) =	$\frac{\text{THQ} \times \text{ATn}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times (1/\text{RfC}) \times (1/\text{VF} + 1/\text{PEF})}$						
Soil Inhalation RG (carcinogenic) =	$\frac{\text{TR} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times \text{IUR} \times (1/\text{VF} + 1/\text{PEF})}$						
Constituent of Potential Concern	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Unit Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
Trichloroethene (carcinogenic)	--	4.60E-02	1.42E+03	--	4.10E-03	3.20E+02	2.61E+02

Notes:

Cells highlighted in blue are the lowest calculated soil remediation goal for that constituent.

NC - Not calculable. Dermal absorption factor not available.

RG - Soil cleanup goal

TABLE B-3
DERIVATION OF SOIL CLEANUP GOALS - CONSTRUCTION WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway				Soil Cleanup Goals Equation						
Constituent of Potential Concern	Soil Ingestion RG (non-carcinogenic) =			$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times (1/\text{RfDo}) \times \text{IR} \times \text{CF1}}$						
	Soil Ingestion RG (carcinogenic) =			$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{CSFo} \times \text{IR} \times \text{CF1}}$						
	Soil Dermal RG (non-carcinogenic) =			$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times 1/(RfDo \times GIABS) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$						
	Soil Dermal RG (carcinogenic) =			$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times (\text{CSFo}/\text{GIABS}) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$						
	Soil Inhalation RG (non-carcinogenic) =			$\frac{\text{THQ} \times \text{ATn}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times (1/\text{RfC}) \times (1/\text{VF} + 1/\text{PEF})}$						
	Soil Inhalation RG (carcinogenic) =			$\frac{\text{TR} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times \text{IUR} \times (1/\text{VF} + 1/\text{PEF})}$						
INORGANICS	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Oral Reference Dose (adjusted for gastrointestinal absorption) mg/kg-day	Oral Cancer Slope Factor (adjusted for gastrointestinal absorption) (mg/kg-day) ⁻¹	Dermal RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Unit Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
Arsenic (non-carcinogenic)	3.00E-04	--	2.21E+02	3.00E-04	--	2.34E+03	1.50E-05	--	6.16E+04	2.01E+02
Arsenic (carcinogenic)	--	1.50E+00	3.44E+02	--	1.50E+00	3.64E+03	--	4.30E+00	6.68E+05	3.14E+02
Cyanide (non-carcinogenic)	6.00E-04	--	4.42E+02	6.00E-04	--	NC	8.00E-04	--	3.29E+06	4.42E+02
Cyanide (carcinogenic)	--	--	--	--	--	--	--	--	--	--
Nickel (non-carcinogenic)	2.00E-02	--	1.47E+04	8.00E-04	--	NC	9.00E-05	--	3.70E+05	1.42E+04
Nickel (carcinogenic)	--	--	--	--	--	--	--	2.60E-01	1.11E+07	1.11E+07
POLYCYCLIC AROMATIC HYDROCARBONS										
Benzo(a)pyrene (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene (carcinogenic)	--	7.30E+00	7.07E+01	--	7.30E+00	1.72E+02	--	1.10E+00	2.61E+06	5.01E+01
Benzo(b)fluoranthene (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene (carcinogenic)	--	7.30E-01	7.07E+02	--	7.30E-01	1.72E+03	--	1.10E-01	2.61E+07	5.01E+02
TOTAL PETROLEUM HYDROCARBONS										
Total Petroleum Hydrocarbons (non-carcinogenic)	4.00E-03	--	2.95E+03	4.00E-03	--	NC	3.00E-03	--	1.23E+07	2.95E+03
Total Petroleum Hydrocarbons (carcinogenic)	--	--	--	--	--	--	--	--	--	--

TABLE B-3
DERIVATION OF SOIL CLEANUP GOALS - CONSTRUCTION WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway		Soil Cleanup Goals Equation								
Soil Ingestion RG (non-carcinogenic) =		$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times (1/\text{RfDo}) \times \text{IR} \times \text{CF1}}$								
Soil Ingestion RG (carcinogenic) =		$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{CSFo} \times \text{IR} \times \text{CF1}}$								
Soil Dermal RG (non-carcinogenic) =		$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times 1/(RfDo \times GIABS) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$								
Soil Dermal RG (carcinogenic) =		$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times (\text{CSFo}/\text{GIABS}) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$								
Soil Inhalation RG (non-carcinogenic) =		$\frac{\text{THQ} \times \text{ATn}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times (1/\text{RfC}) \times (1/\text{VF} + 1/\text{PEF})}$								
Soil Inhalation RG (carcinogenic) =		$\frac{\text{TR} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times \text{IUR} \times (1/\text{VF} + 1/\text{PEF})}$								
Constituent of Potential Concern	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Oral Reference Dose (adjusted for gastrointestinal absorption) mg/kg-day	Oral Cancer Slope Factor (adjusted for gastrointestinal absorption) (mg/kg-day) ⁻¹	Dermal RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
POLYCHLORINATED BIPHENYLS										
PCBs - high risk (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
PCBs - high risk (carcinogenic)	--	2.00E+00	2.58E+02	--	2.00E+00	5.84E+02	--	5.70E-01	5.04E+06	1.79E+02
VOLATILE ORGANIC COMPOUNDS										
Trichloroethene (non-carcinogenic)	5.00E-04	--	3.69E+02	5.00E-04	--	NC	2.00E-03	--	3.91E+01	3.53E+01
Trichloroethene (carcinogenic)	--	4.60E-02	1.12E+04	--	4.60E-02	NC	--	4.10E-03	3.33E+03	2.57E+03

Notes:

Cells highlighted in blue are the lowest calculated soil remediation goal for that constituent.

NC - Not calculable. Dermal absorption factor not available.

RG - Soil cleanup goal

TABLE B-4
DERIVATION OF SOIL CLEANUP GOALS - UTILITY WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway				Soil Cleanup Goal Equation						
Constituent of Potential Concern	Soil Ingestion RG (non-carcinogenic) =			$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times (1/\text{RfDo}) \times \text{IR} \times \text{CF1}}$						
	Soil Ingestion RG (carcinogenic) =			$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{CSFo} \times \text{IR} \times \text{CF1}}$						
	Soil Dermal RG (non-carcinogenic) =			$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times 1/(RfDo \times GIABS) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$						
	Soil Dermal RG (carcinogenic) =			$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times (\text{CSFo}/\text{GIABS}) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$						
	Soil Inhalation RG (non-carcinogenic) =			$\frac{\text{THQ} \times \text{ATn}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times (1/\text{RfC}) \times (1/\text{VF} + 1/\text{PEF})}$						
	Soil Inhalation RG (carcinogenic) =			$\frac{\text{TR} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times \text{IUR} \times (1/\text{VF} + 1/\text{PEF})}$						
INORGANICS	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Oral Reference Dose (adjusted for gastrointestinal absorption) mg/kg-day	Oral Cancer Slope Factor (adjusted for gastrointestinal absorption) (mg/kg-day) ⁻¹	Dermal RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Unit Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
Arsenic (non-carcinogenic)	3.00E-04	--	3.65E+03	3.00E-04	--	1.75E+04	1.50E-05	--	3.08E+05	2.99E+03
Arsenic (carcinogenic)	--	1.50E+00	2.27E+02	--	1.50E+00	1.09E+03	--	4.30E+00	1.34E+05	1.88E+02
Cyanide (non-carcinogenic)	6.00E-04	--	7.30E+03	6.00E-04	--	NC	8.00E-04	--	1.64E+07	7.30E+03
Cyanide (carcinogenic)	--	--	--	--	--	--	--	--	--	--
Nickel (non-carcinogenic)	2.00E-02	--	2.43E+05	8.00E-04	--	NC	9.00E-05	--	1.85E+06	2.15E+05
Nickel (carcinogenic)	--	--	--	--	--	--	--	2.60E-01	2.21E+06	2.21E+06
POLYCYCLIC AROMATIC HYDROCARBONS										
Benzo(a)pyrene (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene (carcinogenic)	--	7.30E+00	4.67E+01	--	7.30E+00	5.17E+01	--	1.10E+00	5.23E+05	2.45E+01
Benzo(b)fluoranthene (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene (carcinogenic)	--	7.30E-01	4.67E+02	--	7.30E-01	5.17E+02	--	1.10E-01	5.23E+06	2.45E+02
TOTAL PETROLEUM HYDROCARBONS										
Total Petroleum Hydrocarbons (non-carcinogenic)	4.00E-03	--	4.87E+04	4.00E-03	--	NC	3.00E-03	--	6.16E+07	4.86E+04
Total Petroleum Hydrocarbons (carcinogenic)	--	--	--	--	--	--	--	--	--	--

TABLE B-4
DERIVATION OF SOIL CLEANUP GOALS - UTILITY WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway		Soil Cleanup Goal Equation								
Soil Ingestion RG (non-carcinogenic) =		$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times (1/\text{RfDo}) \times \text{IR} \times \text{CF1}}$								
Soil Ingestion RG (carcinogenic) =		$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{CSFo} \times \text{IR} \times \text{CF1}}$								
Soil Dermal RG (non-carcinogenic) =		$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times 1/(\text{RfDo} \times \text{GIABS}) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$								
Soil Dermal RG (carcinogenic) =		$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times (\text{CSFo}/\text{GIABS}) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$								
Soil Inhalation RG (non-carcinogenic) =		$\frac{\text{THQ} \times \text{ATn}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times (1/\text{RfC}) \times (1/\text{VF} + 1/\text{PEF})}$								
Soil Inhalation RG (carcinogenic) =		$\frac{\text{TR} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times \text{IUR} \times (1/\text{VF} + 1/\text{PEF})}$								
Constituent of Potential Concern	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Oral Reference Dose (adjusted for gastrointestinal absorption) mg/kg-day	Oral Cancer Slope Factor (adjusted for gastrointestinal absorption) (mg/kg-day) ⁻¹	Dermal RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
POLYCHLORINATED BIPHENYLS										
PCBs - high risk (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
PCBs - high risk (carcinogenic)	--	2.00E+00	1.70E+02	--	2.00E+00	1.75E+02	--	5.70E-01	1.01E+06	8.64E+01
VOLATILE ORGANIC COMPOUNDS										
Trichloroethene (non-carcinogenic)	5.00E-04	--	6.08E+03	5.00E-04	--	NC	2.00E-03	--	9.76E+02	8.41E+02
Trichloroethene (carcinogenic)	--	4.60E-02	7.41E+03	--	4.60E-02	NC	--	4.10E-03	3.33E+03	2.30E+03

Notes:

Cells highlighted in blue are the lowest calculated soil remediation goal for that constituent.

NC - Not calculable. Dermal absorption factor not available.

RG - Soil cleanup goal

TABLE B-5
DERIVATION OF SOIL CLEANUP GOALS - OLDER CHILD TRESPASSER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway				Soil Cleanup Goal Equation						
Constituent of Potential Concern	Soil Ingestion RG (non-carcinogenic) =			$\frac{THQ \times BW \times ATn}{EF \times ED \times (1/RfDo) \times IR \times CF1}$						
	Soil Ingestion RG (carcinogenic) =			$\frac{TR \times BW \times ATc}{EF \times ED \times CSFo \times IR \times CF1}$						
	Soil Dermal RG (non-carcinogenic) =			$\frac{THQ \times BW \times ATn}{EF \times ED \times 1/(RfDo \times GIABS) \times SA \times AF \times ABS \times CF1}$						
	Soil Dermal RG (carcinogenic) =			$\frac{TR \times BW \times ATc}{EF \times ED \times (CSFo/GIABS) \times SA \times AF \times ABS \times CF1}$						
	Soil Inhalation RG (non-carcinogenic) =			$\frac{THQ \times ATn}{EF \times ED \times ET \times CF2 \times (1/RfC) \times (1/VF + 1/PEF)}$						
	Soil Inhalation RG (carcinogenic) =			$\frac{TR \times ATc}{EF \times ED \times ET \times CF2 \times IUR \times (1/VF + 1/PEF)}$						
INORGANICS	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Oral Reference Dose (adjusted for gastrointestinal absorption) mg/kg-day	Oral Cancer Slope Factor (adjusted for gastrointestinal absorption) (mg/kg-day) ⁻¹	Dermal RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Unit Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
Arsenic (non-carcinogenic)	3.00E-04	--	7.97E+02	3.00E-04	--	7.83E+03	1.50E-05	--	1.90E+05	7.21E+02
Arsenic (carcinogenic)	--	1.50E+00	2.07E+02	--	1.50E+00	2.03E+03	--	4.30E+00	3.43E+05	1.88E+02
Cyanide (non-carcinogenic)	6.00E-04	--	1.59E+03	6.00E-04	--	NC	8.00E-04	--	1.01E+07	1.59E+03
Cyanide (carcinogenic)	--	--	--	--	--	--	--	--	--	--
Nickel (non-carcinogenic)	2.00E-02	--	5.32E+04	8.00E-04	--	NC	9.00E-05	--	1.14E+06	5.08E+04
Nickel (carcinogenic)	--	--	--	--	--	--	--	2.60E-01	5.67E+06	5.67E+06
POLYCYCLIC AROMATIC HYDROCARBONS										
Benzo(a)pyrene (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene (carcinogenic)	--	7.30E+00	4.25E+01	--	7.30E+00	9.63E+01	--	1.10E+00	1.34E+06	2.95E+01
Benzo(b)fluoranthene (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene (carcinogenic)	--	7.30E-01	4.25E+02	--	7.30E-01	9.63E+02	--	1.10E-01	1.34E+07	2.95E+02
TOTAL PETROLEUM HYDROCARBONS										
Total Petroleum Hydrocarbons (non-carcinogenic)	4.00E-03	--	1.06E+04	4.00E-03	--	NC	3.00E-03	--	3.79E+07	1.06E+04
Total Petroleum Hydrocarbons (carcinogenic)	--	--	--	--	--	--	--	--	--	--

TABLE B-5
DERIVATION OF SOIL CLEANUP GOALS - OLDER CHILD TRESPASSER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway		Soil Cleanup Goal Equation								
Soil Ingestion RG (non-carcinogenic) =		$\frac{THQ \times BW \times ATn}{EF \times ED \times (1/RfDo) \times IR \times CF1}$								
Soil Ingestion RG (carcinogenic) =		$\frac{TR \times BW \times ATc}{EF \times ED \times CSFo \times IR \times CF1}$								
Soil Dermal RG (non-carcinogenic) =		$\frac{THQ \times BW \times ATn}{EF \times ED \times 1/(RfDo \times GIABS) \times SA \times AF \times ABS \times CF1}$								
Soil Dermal RG (carcinogenic) =		$\frac{TR \times BW \times ATc}{EF \times ED \times (CSFo/GIABS) \times SA \times AF \times ABS \times CF1}$								
Soil Inhalation RG (non-carcinogenic) =		$\frac{THQ \times ATn}{EF \times ED \times ET \times CF2 \times (1/RfC) \times (1/VF + 1/PEF)}$								
Soil Inhalation RG (carcinogenic) =		$\frac{TR \times ATc}{EF \times ED \times ET \times CF2 \times IUR \times (1/VF + 1/PEF)}$								
Constituent of Potential Concern	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Oral Reference Dose (adjusted for gastrointestinal absorption) mg/kg-day	Oral Cancer Slope Factor (adjusted for gastrointestinal absorption) (mg/kg-day) ⁻¹	Dermal RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
POLYCHLORINATED BIPHENYLS										
PCBs - high risk (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
PCBs - high risk (carcinogenic)	--	2.00E+00	1.55E+02	--	2.00E+00	3.26E+02	--	5.70E-01	2.59E+06	1.05E+02
VOLATILE ORGANIC COMPOUNDS										
Trichloroethene (non-carcinogenic)	5.00E-04	--	1.33E+03	5.00E-04	--	NC	2.00E-03	--	6.01E+02	4.14E+02
Trichloroethene (carcinogenic)	--	4.60E-02	6.74E+03	--	4.60E-02	NC	--	4.10E-03	8.55E+03	3.77E+03

Notes:

Cells highlighted in blue are the lowest calculated soil remediation goal for that constituent.

NC - Not calculable. Dermal absorption factor not available.

RG - Soil cleanup goal

TABLE B-6
DERIVATION OF SOIL CLEANUP GOALS - ADULT TRESPASSER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway		Soil Cleanup Goal Equation									
Constituent of Potential Concern	Soil Ingestion RG (non-carcinogenic) =	$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times (1/\text{RfDo}) \times \text{IR} \times \text{CF1}}$									
	Soil Ingestion RG (carcinogenic) =	$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{CSFo} \times \text{IR} \times \text{CF1}}$									
	Soil Dermal RG (non-carcinogenic) =	$\frac{\text{THQ} \times \text{BW} \times \text{ATn}}{\text{EF} \times \text{ED} \times 1/(RfDo \times GIABS) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$									
	Soil Dermal RG (carcinogenic) =	$\frac{\text{TR} \times \text{BW} \times \text{ATc}}{\text{EF} \times \text{ED} \times (\text{CSFo}/\text{GIABS}) \times \text{SA} \times \text{AF} \times \text{ABS} \times \text{CF1}}$									
	Soil Inhalation RG (non-carcinogenic) =	$\frac{\text{THQ} \times \text{ATn}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times (1/\text{RfC}) \times (1/\text{VF} + 1/\text{PEF})}$									
	Soil Inhalation RG (carcinogenic) =	$\frac{\text{TR} \times \text{ATc}}{\text{EF} \times \text{ED} \times \text{ET} \times \text{CF2} \times \text{IUR} \times (1/\text{VF} + 1/\text{PEF})}$									
INORGANICS	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Oral Reference Dose (adjusted for gastrointestinal absorption) mg/kg-day	Oral Cancer Slope Factor (adjusted for gastrointestinal absorption) (mg/kg-day) ⁻¹	Dermal RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Unit Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg	
Arsenic (non-carcinogenic)	3.00E-04	--	1.12E+03	3.00E-04	--	8.87E+03	1.50E-05	--	1.90E+05	9.92E+02	
Arsenic (carcinogenic)	--	1.50E+00	6.99E+01	--	1.50E+00	5.52E+02	--	4.30E+00	8.23E+04	6.20E+01	
Cyanide (non-carcinogenic)	6.00E-04	--	2.25E+03	6.00E-04	--	NC	8.00E-04	--	1.01E+07	2.25E+03	
Cyanide (carcinogenic)	--	--	--	--	--	--	--	--	--	--	
Nickel (non-carcinogenic)	2.00E-02	--	7.49E+04	8.00E-04	--	NC	9.00E-05	--	1.14E+06	7.02E+04	
Nickel (carcinogenic)	--	--	--	--	--	--	--	2.60E-01	1.36E+06	1.36E+06	
POLYCYCLIC AROMATIC HYDROCARBONS											
Benzo(a)pyrene (non-carcinogenic)	--	--	--	--	--	--	--	--	--		
Benzo(a)pyrene (carcinogenic)	--	7.30E+00	1.44E+01	--	7.30E+00	2.62E+01	--	1.10E+00	3.22E+05	9.27E+00	
Benzo(b)fluoranthene (non-carcinogenic)	--	--	--	--	--	--	--	--	--		
Benzo(b)fluoranthene (carcinogenic)	--	7.30E-01	1.44E+02	--	7.30E-01	2.62E+02	--	1.10E-01	3.22E+06	9.27E+01	
TOTAL PETROLEUM HYDROCARBONS											
Total Petroleum Hydrocarbons (non-carcinogenic)	4.00E-03	--	1.50E+04	4.00E-03	--	NC	3.00E-03	--	3.79E+07	1.50E+04	
Total Petroleum Hydrocarbons (carcinogenic)	--	--	--	--	--	--	--	--	--		

TABLE B-6
DERIVATION OF SOIL CLEANUP GOALS - ADULT TRESPASSER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Exposure Pathway		Soil Cleanup Goal Equation								
Soil Ingestion RG (non-carcinogenic) =		$\frac{THQ \times BW \times ATn}{EF \times ED \times (1/RfDo) \times IR \times CF1}$								
Soil Ingestion RG (carcinogenic) =		$\frac{TR \times BW \times ATc}{EF \times ED \times CSFo \times IR \times CF1}$								
Soil Dermal RG (non-carcinogenic) =		$\frac{THQ \times BW \times ATn}{EF \times ED \times 1/(RfDo \times GIABS) \times SA \times AF \times ABS \times CF1}$								
Soil Dermal RG (carcinogenic) =		$\frac{TR \times BW \times ATc}{EF \times ED \times (CSFo/GIABS) \times SA \times AF \times ABS \times CF1}$								
Soil Inhalation RG (non-carcinogenic) =		$\frac{THQ \times ATn}{EF \times ED \times ET \times CF2 \times (1/RfC) \times (1/VF + 1/PEF)}$								
Soil Inhalation RG (carcinogenic) =		$\frac{TR \times ATc}{EF \times ED \times ET \times CF2 \times IUR \times (1/VF + 1/PEF)}$								
Constituent of Potential Concern	Oral Reference Dose mg/kg-day	Oral Cancer Slope Factor (mg/kg-day) ⁻¹	Ingestion RG mg/kg	Oral Reference Dose (adjusted for gastrointestinal absorption) mg/kg-day	Oral Cancer Slope Factor (adjusted for gastrointestinal absorption) (mg/kg-day) ⁻¹	Dermal RG mg/kg	Inhalation Reference Concentration mg/m ³	Inhalation Risk (mg/m ³) ⁻¹	Inhalation RG mg/kg	Surface Soil RG (all pathways) mg/kg
POLYCHLORINATED BIPHENYLS										
PCBs - high risk (non-carcinogenic)	--	--	--	--	--	--	--	--	--	--
PCBs - high risk (carcinogenic)	--	2.00E+00	5.24E+01	--	2.00E+00	8.87E+01	--	5.70E-01	6.21E+05	3.29E+01
VOLATILE ORGANIC COMPOUNDS										
Trichloroethene (non-carcinogenic)	5.00E-04	--	1.87E+03	5.00E-04	--	NC	2.00E-03	--	6.01E+02	4.55E+02
Trichloroethene (carcinogenic)	--	4.60E-02	2.28E+03	--	4.60E-02	NC	--	4.10E-03	2.05E+03	1.08E+03

Notes:

Cells highlighted in blue are the lowest calculated soil remediation goal for that constituent.

NC - Not calculable. Dermal absorption factor not available.

RG - Soil cleanup goal

TABLE B-7
INPUT PARAMETERS FOR ESTIMATING SOIL CLEANUP GOALS - OUTDOOR INDUSTRIAL WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Parameter	Value	Units	Reference
THQ - Target hazard quotient =	1	unitless	
TR - Target risk =	1E-05	unitless	
RfC - Reference concentration =	chemical-specific	mg/m ³	USEPA 2015
RfDo - Oral reference dose =	chemical-specific	mg/kg-day	USEPA 2015
CSFo - Oral cancer slope factor =	chemical-specific	(mg/kg-day) ⁻¹	USEPA 2015
IUR - Inhalation unit risk =	chemical-specific	(mg/m ³) ⁻¹	USEPA 2015
BW - Body weight =	80	kg	USEPA 2014
ATn - Averaging time (noncarcinogens) =	9125	days	USEPA 2014
ATc - Averaging time (carcinogens) =	25550	years	USEPA 2014
ABS - Dermal absorption factor (arsenic) =	0.03	unitless	USEPA 2004
ABS - Dermal absorption factor (PAHs) =	0.13	unitless	USEPA 2004
ABS - Dermal absorption factor (PCBs) =	0.14	unitless	USEPA 2004
EF - Exposure frequency =	225	days/year	USEPA 2014
ED - Exposure duration =	25	years	USEPA 2014
ET - Exposure time =	8	hours/day	USEPA 2014
GIABS - Gastrointestinal absorption factor (nickel) =	0.04	unitless	USEPA 2004
GIABS - Gastrointestinal absorption factor (other chems) =	1	unitless	USEPA 2004
IR - Soil ingestion rate =	100	mg/day	USEPA 2014
AF - Soil to skin adherence factor =	0.12	mg/cm ²	USEPA 2014
PEF - Particulate emissions factor =	4.50E+08	m ³ /kg	USEPA 2002; site-specific (Appendix B)
SA - Skin surface area available for exposure =	3470	cm ² /day	USEPA 2014
VF - Soil-air volatilization factor (TCE) =	1.07E+04	m ³ /kg	USEPA 2002; site-specific (Appendix B)
CF1 - Conversion factor =	0.000001	kg/mg	Unit conversion
CF2 - Conversion factor =	0.042	days/hour	Unit conversion

References:

- USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355-24.4. Office of Solid Waste and Emergency Response. Washington, D.C. December 2002.
- USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R/99/005. Office of Superfund Remediation and Technology Innovation. Washington, D.C. July 2004.
- USEPA. 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. Office of Solid Waste and Emergency Response. Washington, D.C. February 6, 2014.
- USEPA. 2015. Regional Screening Level (RSL) Summary Table. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_JAN2015.pdf.

TABLE B-8
INPUT PARAMETERS FOR ESTIMATING SOIL CLEANUP GOALS - INDOOR INDUSTRIAL WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Parameter	Value	Units	Reference
THQ - Target hazard quotient =	1	unitless	
TR - Target risk =	1E-05	unitless	
RfC - Reference concentration =	chemical-specific	mg/m ³	USEPA 2015
RfDo - Oral reference dose =	chemical-specific	mg/kg-day	USEPA 2015
CSFo - Oral cancer slope factor =	chemical-specific	(mg/kg-day) ⁻¹	USEPA 2015
IUR - Inhalation unit risk =	chemical-specific	(mg/m ³) ⁻¹	USEPA 2015
BW - Body weight =	80	kg	USEPA 2014
ATn - Averaging time (noncarcinogens) =	9125	days	USEPA 2014
ATc - Averaging time (carcinogens) =	25550	years	USEPA 2014
EF - Exposure frequency =	250	days/year	USEPA 2014
ED - Exposure duration =	25	years	USEPA 2014
ET - Exposure time =	8	hours/day	USEPA 2014
IR - Soil ingestion rate =	50	mg/day	USEPA 2014
PEF - Particulate emissions factor =	4.50E+08	m ³ /kg	USEPA 2002; site-specific (Appendix B)
VF - Soil-air volatilization factor (TCE) =	1.07E+04	m ³ /kg	USEPA 2002; site-specific (Appendix B)
CF1 - Conversion factor =	0.000001	kg/mg	Unit conversion
CF2 - Conversion factor =	0.042	days/hour	Unit conversion

References:

- USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355-24.4. Office of Solid Waste and Emergency Response. Washington, D.C. December 2002.
- USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R/99/005. Office of Superfund Remediation and Technology Innovation. Washington, D.C. July 2004.
- USEPA. 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. Office of Solid Waste and Emergency Response. Washington, D.C. February 6, 2014.
- USEPA. 2015. Regional Screening Level (RSL) Summary Table. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_JAN2015.pdf.

TABLE B-9
INPUT PARAMETERS FOR ESTIMATING SOIL CLEANUP GOALS - CONSTRUCTION WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Parameter	Value	Units	Reference
THQ - Target hazard quotient =	1	unitless	
TR - Target risk =	1E-05	unitless	
RfC - Reference concentration =	chemical-specific	mg/m ³	USEPA 2015
RfDo - Oral reference dose =	chemical-specific	mg/kg-day	USEPA 2015
CSFo - Oral cancer slope factor =	chemical-specific	(mg/kg-day) ⁻¹	USEPA 2015
IUR - Inhalation unit risk =	chemical-specific	(mg/m ³) ⁻¹	USEPA 2015
BW - Body weight =	80	kg	USEPA 2014
ATn - Averaging time (noncarcinogens) =	365	days	USEPA 2014
ATc - Averaging time (carcinogens) =	25550	years	USEPA 2014
ABS - Dermal absorption factor (arsenic) =	0.03	unitless	USEPA 2004
ABS - Dermal absorption factor (PAHs) =	0.13	unitless	USEPA 2004
ABS - Dermal absorption factor (PCBs) =	0.14	unitless	USEPA 2004
EF - Exposure frequency =	120	days/year	Best professional judgment
ED - Exposure duration =	1	years	Best professional judgment
ET - Exposure time =	8	hours/day	USEPA 2014
GIABS - Gastrointestinal absorption factor (nickel) =	0.04	unitless	USEPA 2004
GIABS - Gastrointestinal absorption factor (other chems) =	1	unitless	USEPA 2004
IR - Soil ingestion rate =	330	mg/day	USEPA 2002
AF - Soil to skin adherence factor =	0.3	mg/cm ²	USEPA 2004
PEF - Particulate emissions factor =	4.50E+08	m ³ /kg	USEPA 2002; site-specific (Appendix B)
SA - Skin surface area available for exposure =	3470	cm ² /day	USEPA 2014
VF - Soil-air volatilization factor (TCE) =	2.14E+03	m ³ /kg	USEPA 2002; site-specific (Appendix B)
CF1 - Conversion factor =	0.000001	kg/mg	Unit conversion
CF2 - Conversion factor =	0.042	days/hour	Unit conversion

References:

- USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355-24.4. Office of Solid Waste and Emergency Response. Washington, D.C. December 2002.
- USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R/99/005. Office of Superfund Remediation and Technology Innovation. Washington, D.C. July 2004.
- USEPA. 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. Office of Solid Waste and Emergency Response. Washington, D.C. February 6, 2014.
- USEPA. 2015. Regional Screening Level (RSL) Summary Table. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_JAN2015.pdf.

TABLE B-10
INPUT PARAMETERS FOR ESTIMATING SOIL CLEANUP GOALS - UTILITY WORKER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Parameter	Value	Units	Reference
THQ - Target hazard quotient =	1	unitless	
TR - Target risk =	1E-05	unitless	
RfC - Reference concentration =	chemical-specific	mg/m ³	USEPA 2015
RfDo - Oral reference dose =	chemical-specific	mg/kg-day	USEPA 2015
CSFo - Oral cancer slope factor =	chemical-specific	(mg/kg-day) ⁻¹	USEPA 2015
IUR - Inhalation unit risk =	chemical-specific	(mg/m ³) ⁻¹	USEPA 2015
BW - Body weight =	80	kg	USEPA 2014
ATn - Averaging time (noncarcinogens) =	9125	days	USEPA 2014
ATc - Averaging time (carcinogens) =	25550	years	USEPA 2014
ABS - Dermal absorption factor (arsenic) =	0.03	unitless	USEPA 2004
ABS - Dermal absorption factor (PAHs) =	0.13	unitless	USEPA 2004
ABS - Dermal absorption factor (PCBs) =	0.14	unitless	USEPA 2004
EF - Exposure frequency =	24	days/year	Best professional judgment
ED - Exposure duration =	25	years	USEPA 2014
ET - Exposure time =	8	hours/day	USEPA 2014
GIABS - Gastrointestinal absorption factor (nickel) =	0.04	unitless	USEPA 2004
GIABS - Gastrointestinal absorption factor (other chems) =	1	unitless	USEPA 2004
IR - Soil ingestion rate =	100	mg/day	USEPA 2014
AF - Soil to skin adherence factor =	0.2	mg/cm ²	USEPA 2004
PEF - Particulate emissions factor =	4.50E+08	m ³ /kg	USEPA 2002; site-specific (Appendix B)
SA - Skin surface area available for exposure =	3470	cm ² /day	USEPA 2014
VF - Soil-air volatilization factor (TCE) =	1.07E+04	m ³ /kg	USEPA 2002; site-specific (Appendix B)
CF1 - Conversion factor =	0.000001	kg/mg	Unit conversion
CF2 - Conversion factor =	0.042	days/hour	Unit conversion

References:

- USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355-24.4. Office of Solid Waste and Emergency Response. Washington, D.C. December 2002.
- USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R/99/005. Office of Superfund Remediation and Technology Innovation. Washington, D.C. July 2004.
- USEPA. 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. Office of Solid Waste and Emergency Response. Washington, D.C. February 6, 2014.
- USEPA. 2015. Regional Screening Level (RSL) Summary Table. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_JAN2015.pdf.

TABLE B-11
INPUT PARAMETERS FOR ESTIMATING SOIL CLEANUP GOALS - OLDER CHILD TRESPASSER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Parameter	Value	Units	Reference
THQ - Target hazard quotient =	1	unitless	
TR - Target risk =	1E-05	unitless	
RfC - Reference concentration =	chemical-specific	mg/m ³	USEPA 2015
RfDo - Oral reference dose =	chemical-specific	mg/kg-day	USEPA 2015
CSFo - Oral cancer slope factor =	chemical-specific	(mg/kg-day) ⁻¹	USEPA 2015
IUR - Inhalation unit risk =	chemical-specific	(mg/m ³) ⁻¹	USEPA 2015
BW - Body weight =	56.8	kg	USEPA 2011
ATn - Averaging time (noncarcinogens) =	2190	days	USEPA 2014
ATc - Averaging time (carcinogens) =	25550	years	USEPA 2014
ABS - Dermal absorption factor (arsenic) =	0.03	unitless	USEPA 2004
ABS - Dermal absorption factor (PAHs) =	0.13	unitless	USEPA 2004
ABS - Dermal absorption factor (PCBs) =	0.14	unitless	USEPA 2004
EF - Exposure frequency =	78	days/year	Best professional judgment
ED - Exposure duration =	6	years	Receptor-specific
ET - Exposure time =	4	hours/day	Best professional judgment
GIABS - Gastrointestinal absorption factor (nickel) =	0.04	unitless	USEPA 2004
GIABS - Gastrointestinal absorption factor (other chems) =	1	unitless	USEPA 2004
IR - Soil ingestion rate =	100	mg/day	USEPA 2014
AF - Soil to skin adherence factor =	0.07	mg/cm ²	USEPA 2014
PEF - Particulate emissions factor =	4.50E+08	m ³ /kg	USEPA 2002; site-specific (Appendix B)
SA - Skin surface area available for exposure =	4849	cm ² /day	USEPA 2004
VF - Soil-air volatilization factor (TCE) =	1.07E+04	m ³ /kg	USEPA 2002; site-specific (Appendix B)
CF1 - Conversion factor =	0.000001	kg/mg	Unit conversion
CF2 - Conversion factor =	0.042	days/hour	Unit conversion

References:

- USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355-24.4. Office of Solid Waste and Emergency Response. Washington, D.C. December 2002.
- USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R/99/005. Office of Superfund Remediation and Technology Innovation. Washington, D.C. July 2004.
- USEPA. 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F. Office of Research and Development. Washington, D.C. September 2011.
- USEPA. 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. Office of Solid Waste and Emergency Response. Washington, D.C. February 6, 2014.
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TABLE B-12
INPUT PARAMETERS FOR ESTIMATING SOIL CLEANUP GOALS - ADULT TRESPASSER
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Parameter	Value	Units	Reference
THQ - Target hazard quotient =	1	unitless	
TR - Target risk =	1E-05	unitless	
RfC - Reference concentration =	chemical-specific	mg/m ³	USEPA 2015
RfDo - Oral reference dose =	chemical-specific	mg/kg-day	USEPA 2015
CSFo - Oral cancer slope factor =	chemical-specific	(mg/kg-day) ⁻¹	USEPA 2015
IUR - Inhalation unit risk =	chemical-specific	(mg/m ³) ⁻¹	USEPA 2015
BW - Body weight =	80	kg	USEPA 2014
ATn - Averaging time (noncarcinogens) =	9125	days	USEPA 2014
ATc - Averaging time (carcinogens) =	25550	years	USEPA 2014
ABS - Dermal absorption factor (arsenic) =	0.03	unitless	USEPA 2004
ABS - Dermal absorption factor (PAHs) =	0.13	unitless	USEPA 2004
ABS - Dermal absorption factor (PCBs) =	0.14	unitless	USEPA 2004
EF - Exposure frequency =	78	days/year	Best professional judgment
ED - Exposure duration =	25	years	Best professional judgment
ET - Exposure time =	4	hours/day	Best professional judgment
GIABS - Gastrointestinal absorption factor (nickel) =	0.04	unitless	USEPA 2004
GIABS - Gastrointestinal absorption factor (other chems) =	1	unitless	USEPA 2004
IR - Soil ingestion rate =	100	mg/day	USEPA 2014
AF - Soil to skin adherence factor =	0.07	mg/cm ²	USEPA 2014
PEF - Particulate emissions factor =	4.50E+08	m ³ /kg	USEPA 2002; site-specific (Appendix B)
SA - Skin surface area available for exposure =	6032	cm ² /day	USEPA 2014
VF - Soil-air volatilization factor (TCE) =	1.07E+04	m ³ /kg	USEPA 2002; site-specific (Appendix B)
CF1 - Conversion factor =	0.000001	kg/mg	Unit conversion
CF2 - Conversion factor =	0.042	days/hour	Unit conversion

References:

- USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355-24.4. Office of Solid Waste and Emergency Response. Washington, D.C. December 2002.
- USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R/99/005. Office of Superfund Remediation and Technology Innovation. Washington, D.C. July 2004.
- USEPA. 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F. Office of Research and Development. Washington, D.C. September 2011.
- USEPA. 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. Office of Solid Waste and Emergency Response. Washington, D.C. February 6, 2014.
- USEPA. 2015. Regional Screening Level (RSL) Summary Table. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_JAN2015.pdf.

TABLE B-13
PARTICULATE EMISSIONS FACTOR CALCULATIONS
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

$$Q/C_{wind} = A \times \exp \left[\frac{(\ln A_s - B)^2}{C} \right]$$

Equation 5-6, USEPA 2002

Variable	Value	Units	Rationale
A =	12.8612	unitless	unitless, Cleveland, OH Zone VII values, Exhibit D-2, USEPA 2002
B =	20.5164	unitless	unitless, Cleveland, OH Zone VII values, Exhibit D-2, USEPA 2002
C =	237.2798	unitless	unitless, Cleveland, OH Zone VII values, Exhibit D-2, USEPA 2002
A _s Site =	400	acres	Areal extent of potentially affected soil

Q/C_{wind} = 31.2916 g/m²-s per kg/m³

$$PEF_{wind} = Q/C_{wind} \times \frac{3600s/h}{0.036 \times (1 - V) \times (U_m/U_t)^3 \times F(x)}$$

Equation 4-5, USEPA 2002

Variable	Value	Units	Rationale
U _m =	4.02	m/s	Mean annual windspeed (Current Results 2015)
U _t =	11.32	m/s	Threshold windspeed at 7m (USEPA 2002)
F(x) =	0.194	unitless	Function dependent on U _m /U _t (USEPA 2002)
V =	0.20	unitless	Fraction of vegetative cover (estimated)

PEF = 4.50E+08 m³/kg

References:

USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December 2002.
Current Results. 2015. Annual Average Wind Speed in U.S. Cities - Cincinnati, Ohio.

TABLE B-14
 SOIL-TO-AIR VOLATILIZATION FACTORS - Q/C_{vol} CALCULATION
 GE AVIATION EVENDALE FACILITY
 EVENDALE, OHIO

Area	Receptor(s)	Area (acres)	Q/C _{vol} (g/m ² ·s per kg/m ³)
Evendale Site	Utility Worker, Construction Worker, Industrial Worker	400	31.3

$$Q/C_{vol} = A \times \exp \left[\frac{(\ln A_s - B)^2}{C} \right]$$

Exhibit D-3, USEPA 2002

<u>Variable</u>	<u>Value</u>	<u>Units/Rationale/Source</u>
A =	12.8612	unitless, Cleveland, OH Zone VII values, Exhibit D-3, USEPA 2002
B =	20.5164	unitless, Cleveland, OH Zone VII values, Exhibit D-3, USEPA 2002
C =	237.2798	unitless, Cleveland, OH Zone VII values, Exhibit D-3, USEPA 2002

Reference:

USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24.
 December 2002.

TABLE B-15
SOIL-TO-AIR VOLATILIZATION FACTORS - APPARENT DIFFUSIVITY CALCULATIONS
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

Parameter	Units	Value	Source
Soil Particle Density	(g/cm ³)	2.65E+00	Default value, USEPA, 2002, Equation 4-8
Water-filled Soil Porosity	(L _{water} /L _{soil})	1.50E-01	Default value, USEPA, 2002, Equation 4-8
Total Soil Porosity	(L _{pore} /L _{soil})	4.30E-01	Default value, USEPA, 2002, Equation 4-8
Air-filled Soil Porosity	(L _{air} /L _{soil})	2.80E-01	Default value, USEPA, 2002, Equation 4-8
Dry Soil Bulk Density	(g/cm ³)	1.50E+00	Default value, USEPA, 2002, Equation 4-8
Exposure Interval	(s)	9.50E+08	Default value, USEPA, 2002, Equation 4-8
Fraction Organic Carbon in Soil	g/g	6.00E-03	Default value, USEPA, 2002, Equation 4-8

Compound	Diffusivity in Air (D _i) (cm ² /s)	Dimensionless Henry's Law Constant (H')	Diffusivity in Water (D _w) (cm ² /s)	Soil-Water Partition Coefficient (K _d) (cm ³ /g)	Soil Organic Carbon Partition Coefficient (K _{oc}) (cm ³ /g)	Apparent Diffusivity (D _a) (cm ² /s)
Trichloroethylene (TCE)	6.87E-02	4.03E-01	1.02E-05	3.64E-01	6.07E+01	2.35E-05

Notes:

Apparent diffusivity (D_a) calculated using Equation 4-8 (USEPA 2002).

K_d value calculated per USEPA 2002: K_{oc} x F_{oc}

References:

USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Solid Waste and Emergency Response. OSWER 9355.4-24 December 2002.

Oak Ridge National Laboratory. 2013. Risk Assessment Information System - Chemical Specific Parameters. http://rais.ornl.gov/cgi-bin/tools/TOX_search?select=chem_spref.

TABLE B-16
SOIL-TO-AIR VOLATILIZATION FACTORS - VOLATILIZATION FACTOR CALCULATIONS
GE AVIATION EVENDALE FACILITY
EVENDALE, OHIO

$$VF(m^3/kg) = Q/C \times \frac{(3.14 \times D_A \times T)^{1/2}}{(2 \times \rho_b \times D_A)} \times 10^{-4} (m^2/cm^2)$$

Constituent	DA (cm ² /s)	T (s)	r _b (g/cm ³)	Site Volatilization Factor (m ³ /kg)
Trichloroethylene (TCE)	2.35E-05	7.88E+08	1.50E+00	1.07E+04

Reference:

USEPA. 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response.
OSWER 9355.4-24. December 2002.

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